

NATURE MAGAZINE



November, 1948

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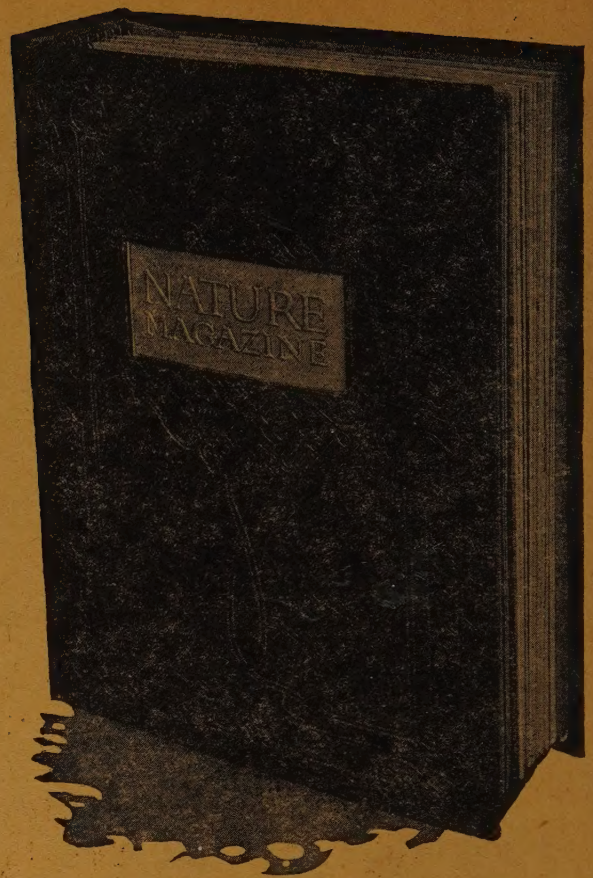
Vol. 41, No. 9

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Nature in Print

By HOWARD ZAHNISER

WE HAD just returned from a mountain climb in the Adirondacks and had stopped by the post office. There was William Vogt's *Road to Survival*. By kerosene lamp light I read it that night with an admiring eagerness, literally burning the midnight oil. I went to bed reflecting on the book's illumination of our world living problems—and on the strong and good influences such a volume can exert. It was curious, then, to recall the earlier experiences of the day. There in an eastern New York State wilderness area, atop a mountain ridge, we had that day eaten a can of salmon from the Columbia River across the continent. I have no memory for menus, but there was also a can of fruit salad, from one wonders where, and chocolate bars, of course. A little later we had waited patiently for water to drip—drop by single drop—and collect in a small, hand-fashioned catch-basin until we could drink it, sip by sip, from a teaspoon for dipper, our only ladle that was shallow enough. For lunch we had enjoyed some of the luxuries of civilization, but they meant little to us when thirst came. After reading Mr. Vogt's book these simple circumstances of a day's hike seemed to have an instructive significance.

These reflections also brought to mind Fairfield Osborn's recent volume called *Our Plundered Planet*. This book, said its author, "sprang from the conviction that we human beings were rushing forward unthinkingly . . . and that we had forgotten the earth, forgotten it in the sense that we were failing to regard it as the source of our life." Taking first "The Long View," Fairfield Osborn considered the earth in its place in space, and in its development through the aeons of past time, and then contemplated man's relation to this earth. He then described man's destructiveness to the earth's natural resources. Region by region, he viewed an alarming scene in which the peoples of the world, under severe population pressures, face an impending shortage of basic necessities. War threats, starvation, ruined living standards were on the immediate horizon, and dire in the extreme the results of continued plundering.

"Nature may be a thing of beauty and is indeed a symphony," he wrote, "but above and below and within its own immutable essences, its distances, its apparent quietness and changelessness it is an active, purposeful, coordinated machine. Each part is dependent upon another, all are related to the movement of the whole. Forests, grasslands, soils, water, animal life—without one of these the earth will die—will become as dead as the moon."

Here was a thoughtful, a meditative series of essays, an ominous declaration of the importance of conservation to a plundering race. It was brief, yet, as its author himself commented, "a considerable amount of information on a variety of subjects" was "woven into its pages." It dealt with cases, with specific examples. It was provocative of solemn thinking. And it was presented to a large audience—a fact that was significantly discussed by the editor of this magazine in an editorial in the June-July issue.

Here now, in a volume that has had the wide distribution of the Book-of-the-Month Club, William Vogt declares:

"Above all, we must learn to know—to feel to the core of our beings—our dependence on the earth and the riches with which it sustains us. . . . We must come to understand our past, our history, in terms of the soil and water and forests and grasses that have made it what it is. . . . Our education must be reshaped, as the story of our existence in an environment as

completely subjected to physical laws as is a ball we let drop from our hands. Our philosophies must be rewritten to remove them from the domain of words and 'ideas' and to plant their roots firmly in the earth."

We are in a trap, Mr. Vogt warns—an ecological trap. We backed into it "by excessive breeding and abuse of the land." Our "first step on the long road back"—our beginning of wisdom—is a world-wide awakening of mankind. "The second step is dual—the control of populations and the restoration of resources."

Road to Survival is not so much ecology as it is fervent evangelism. Here, in fact, is ecology become evangelical, an ecological evangelist pointing out the sins of the world and declaring what it must do to be saved.

The author speaks with an authority that one trusts in his field, and he has at call the testimony of other experts, his book being rich in extensive quotations. Many will, therefore, be surprised at his denunciation of corn, his unbalanced criticism of the medical profession, and his general disregard of the possibilities of agricultural research, and will regret the aspect of evangelism that gives him so much confidence in some opinions that would seem to require more careful scrutiny. Yet his pertinent conclusions seem sound, and his demonstration that men are making uninhabitable their only place of abode is certainly a timely warning.

Mr. Vogt writes not only for the intellect. He knows the influence of the emotions, and his writing is often poetic.

"How can one assign a cash value to the heart's lift at the flash of a scarlet tanager,"

he asks, "the outpoured song of the solitaire, the towering of white ibises over the Everglades, or even the homely chattering of the dooryard wren? What of the blue sweep of the crow's-foot violets across the prairie, the indescribable scarlet of the cardinal flower, the dainty perfection of Dutchman's-breeches and moccasin flower, the spring tocsin of the humble skunk cabbage?"

Of the vanishing forms of wildlife being wiped out by man's "vandalism," he writes:

"The very forces that shaped the earth molded their form, determined their destiny. Through thousands and tens of thousands of generations, the wind and the cold, the march of the seasons, the changes on the land, the failure and success of plants, and the craftiness of enemies hammered at the malleable substance of these creatures. Endless sorting, endless discarding, endless change brought them to ultimate perfection for the world in which they live. Can man, like some blundering sorcerer's apprentice, afford to smash the crucible in which they have been refined, reduce them to a mere memory, a bunch of stuffed feathers in a museum?"

Essentially, however, unlike most of the conservation writers, Mr. Vogt is not pleading for a cause but rather is "telling" his readers . . . and sharply describing the alternative. He describes with painful persuasiveness a startling situation and gives an explanation that makes it uncomfortably apparent what our trouble is. And he does this in some detail not only for this country, this continent, this hemisphere, but indeed for all the continents—for the total environment of the earth.

His essential insistence is on an equation, $C = B : E$, whereby he states that the ability of the earth (or any part of it) to provide for its inhabitants is determined by the land's productiveness as affected by the limitations placed upon this productiveness. C (carrying capacity) $= B$ (biotic potential) $: E$ (environmental resistance). "*The carrying capacity*," says Mr. Vogt in italics, "*is the resultant of the ratio between the other two factors.*"

The earth's productiveness, the biotic potential, it is pointed out again and again, has been subject to such a severe environmental resistance from man since his industrial revolution that the carrying capacity is being alarmingly changed. Yet a most dismaying aspect of this environmental resistance is a

Seeing

By EDWARD McNAMEE

The lightning flashed,
One man saw forks of flame.
Another, startled . . . saw
God sign his name.

tremendous increase in population—in other words, an increasing tax on the earth's carrying capacity.

Therein lies the unique emphasis of Mr. Vogt's conservation evangelism. Others have spoken fervently for the conservation of our resources. None among conservationists has made population control a cardinal doctrine. Mr. Vogt does. Again and again and very plainly, he advocates it.

Mr. Vogt also gives, among conservation writers, a pioneering strong emphasis to "the new science of general semantics," devoting an entire chapter of *Road to Survival* to a discussion based largely on Alfred Korzybski's *Science and Sanity*—a chapter entitled "As Mankind Thinketh."

There is no doubt that here is a significant volume—an excitingly read book that has meaning for everyone, including conservationists. Mr. Vogt and Fairfield Osborn have both gone beyond the confines of conventional conservation concerns and in so doing have been met by a "public" of readers far more numerous than other conservation writers have known. Here, in truth, are two excellent works to give to those friends who wonder about why conservation seems so important to us. Here too are discussions that we should most earnestly read ourselves. Most of the conservation groups, says Mr. Vogt (somewhat equivocally), "are hampered by an insufficiently critical evaluation of their own work." Here, then, in *Road to Survival*, and also in *Our Plundered Planet*, is an opportunity to view our various special conservation or preservation concerns in the light of the grave total-environment problems these works discuss—in the light of discussions that are of unusual interest to much larger numbers of the general public than we usually have in attendance. Conservationists should be inspired by these books, inspired and stimulated to re-evaluate their programs. The general public that has so far been unimpressed should be moved to make conservation a dominant concern.

Our Plundered Planet. By Fairfield Osborn. Boston: Little, Brown & Co. 1948. 217 pp., with bibliography and reading list. \$2.50.

Road to Survival. By William Vogt. New York: William Sloane Associates, Inc. 1948. 335 pp., with introduction by Bernard Baruch, 9 graphic drawings by Stuart I. Freeman, list of references, reading list, and index. \$4.

The Recreation Dollar

For people concerned in any way with outdoor recreation there is a great deal of concise information to be found in a booklet entitled "Money Management: The Recreation Dollar", published by the Household Finance Corporation, 919 North Michigan Avenue, Chicago 11, Illinois. The booklet costs a nickel.

Rafinesque Republished

Précis Des Découvertes Somiologiques. By C. S. Rafinesque. New York. 1948. Peter Smith. 58 pages. \$4.00.

This little book, originally published in 1814, was one of Rafinesque's earlier attempts to establish a system of classification of both plants and animals. In a foreword, E. D. Merrill, Arnold Professor of Botany, Emeritus, of Harvard University, says: "In spite of the brevity of the original descriptions as given in the *Précis*, this little work is and always will be basic in reference to taxonomic studies of both plants and animals." Only six copies of the original work were found to be available in American libraries, and it is a rare collector's item. However, the publisher felt that, in view of the stress placed upon the importance of the work by Professor Merrill, it should be made available to botanists and zoologists. He has, therefore, reproduced the book, in the original French, in a lithoprint and in a limited edition. It is Mr. Smith's hope to reproduce other "lost" works of rarity and importance if reception of the *Précis* warrants.

Pacific Seashores

Between Pacific Tides. By Edward F. Ricketts and Jack Calvin, with a foreword by John Steinbeck. Stanford, California. 1948. Stanford University Press. 365 pages. Illustrated. \$6.00.

This is a revised edition of a fine and inspiring book, which was first published in 1938, and appears as an unplanned memorial to Dr. Ricketts. This marine biologist, who was the real-life "Doc" in John Steinbeck's novel, *Cannery Row*, was killed in an automobile accident in May, 1948, when the volume was in its final publication stages. The book is an account of the habits and habitats of some five hundred of the common and conspicuous invertebrates of the seashore on the Pacific between Sitka, Alaska, and northern Mexico. As Steinbeck says in his foreword: "There are good things to see in the tidepools and there are exciting and interesting thoughts to be generated from the seeing." This is the book to introduce one to these forms, and, certainly, to generate those thoughts.

Protecting Forests

Forest Protection. By Ralph C. Hawley and Paul W. Stickel. New York. 1948. John Wiley and Sons. Second Edition. 355 pages. \$4.50.

This textbook is the most complete in existence on the subject of forest protection. Forest fires and their effects, causes, character, suppression and presuppression constitute the major portion of the volume. Protection against injurious plants, insects, over-grazing, injurious wildlife and atmospheric agencies are, however, all included.

New Books for Your Nature Library

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By WILLIAM M. MANN

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Devoted to the Practical Conservation of the Great National Resources of America

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Romantic Zoology

The Lungfish, the Dodo and the Unicorn. By Willy Ley. New York, 1948. The Viking Press. 361 pages. Illustrated. \$3.75.

The author sub-titles this book "An Excursion into Romantic Zoology", an appropriate and descriptive extension of the main and specific title. The volume is, in fact, a new, revised and considerably enlarged edition, and in it are included fascinating discussions of animals of myth, animals that are now extinct and almost mythical, and animals that are living relics of the past. The book is divided into three parts on this basis, and it is all written for the lay reader who enjoys a different sort of zoological excursion.

"Collared" Seals

Nine Pribilof Island fur seals have been found during the past five summers sporting rubber collars, ring-like pieces of thin sheet rubber. The mystery of this adornment has finally been solved. During the war the Japanese dropped rubber bags containing food to besieged troops in the Aleutian Islands. Some of these bags missed their marks and floated on the water, being carried out to sea. Seal pups, apparently attracted by the food, penetrated the narrow openings of the bags, most of which eventually crumbled away, leaving the rubber rings.

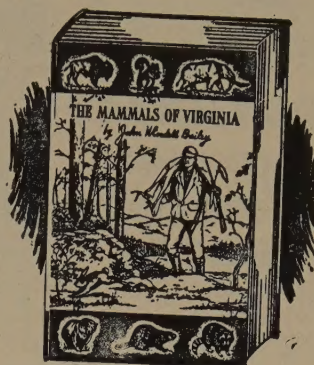
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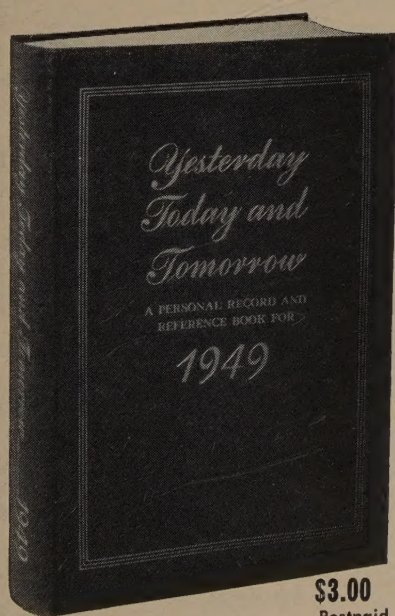
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PIDGIE

By DOROTHY KORTE

One day, while wandering in the woods near my home, I came upon a white pigeon with a beautiful ruff around his neck. He seemed to have nothing special on his mind, and was quite tame. As soon as he saw me, he came as close as he dared, and, as I started home, he followed only a few feet away.

We are so fond of pets that we did everything we could to encourage "Pidgie" to stay with us. He took up his residence in our open garage and, through the fall and severe winter, he stayed there. He would tuck himself off in the eaves in a tiny ball when he slept, and he had a sweet way of talking to us with soft little pigeon noises if we drove in late with the car.

A number of times we built a small house, hoping to protect him from the severe winds, and would place it in his favorite perch. But, instead of going inside, he would just move further along the rafters and take up new quarters.

If we did not feed him as often as he thought necessary, he would make a terrible scolding noise and strut up and down in the most offended manner. He would scold any and everybody who came out of the house until I brought him his cracked corn.

Towards spring he was sunning himself on the ridge pole of the house when all of a sudden three new white pigeons appeared with him. He was absolutely uninterested and paid no attention to them. One little lady sidled up to him and made open advances, but he was quite unmoved. When I put his corn out for him, I thought he would invite his new friends to join him, but he had no such idea. He came to the ground to eat and then went back to the ridge pole to resume his position as isolationist. All afternoon the little lady pigeon made up to him and all afternoon he ignored her. Finally the three visiting pigeons flew away in disgust.

About this time "Pidgie" took to following us to the bus. Anyone of the family who walked the five blocks to the bus was followed overhead by "Pidgie", as a dog would have followed on the ground. At the bus stop there is a high obelisk. He always sat on the top of this obelisk until the bus arrived, and then he would fly back home to us. This happened not once, but many times.

Then one morning, as days were getting fragrant and warm, "Pidgie" disappeared and was never seen again. I suppose the call of the wild got him, but we still miss "Pidgie".

Apology to Detroit

In the October issue we gave the address of the Jam Handy Organization as Detroit, Illinois. The Chamber of Commerce assures us Detroit is still in Michigan.

Contents Noted

ONLY a few days after these words appear in print millions of Americans will go to the polls to vote in a national election. As a disenfranchised citizen of the District of Columbia, our day will be no election day holiday interrupted by a few moments in a voting booth. How we would vote, had we the chance, is *our* secret, but we will confess that our decision would be in large measure influenced by what, during the campaign, seemed to be the conservation integrity of those aspiring to get in, or stay in. As we write this, in humid, early September, the prospect is not clear. Both major parties have indicated some disposition to propitiate the exploitationists and developers; to speak in generalities that are designed to please all. This is, we suppose, good politics. We can, however, look back on a procession of years of pretty good conservation policies on a Federal level, thanks in large measure to Harold L. Ickes and the philosophy he handed on. In the other ranks, Governor Warren of California, seeking what he hopes will not be the relative anonymity of the vice-presidential office, appears to know what conservation is, and how vital it is to our future. Party strategists might consider well that there is, in this country, a large body of independent voters who follow no blind partisan call. Many conservationists, being thoughtful people, are in this group, and their votes are likely to be guided by which candidate appears the soundest on this issue. Ours would, we know.

LOOK for a renewed drive for the abolition of the Jackson Hole National Monument. Opponents of this reservation are boasting that they will succeed in doing away with it, and there is every indication that they will put on a determined drive shortly after the new Congress convenes. Conservationists will have to be on the alert and ready to man the defenses. Threats to our National Park system seem to be growing.

WHILE on the subject of conservation we must call to the attention of our readers an extremely interesting document entitled "Conservation in Micronesia", compiled by Harold J. Coolidge, executive secretary of the Pacific Science Board. It is a report on two conferences on the problems of properly administering the often scant natural resources of those Pacific islands, now our responsibility following victory in the Pacific. Micronesian conservation may seem far removed from such domestic considerations as maintaining our waterfowl population, checking soil erosion and stream pollution, reforestation and protecting our forests. However, it is mighty important to the island dwellers that are now sort of foster

children of ours. And, indirectly, it is mighty important to us in the successful discharge of our responsibilities. This report by Mr. Coolidge, therefore, makes interesting and often surprising reading, an educational excursion that can be taken for the investment of one dollar accompanied by a request for the booklet to the National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

THERE is, it seems to us, an extremely cute and novel idea in the formation of the Bulb of the Month Club, patterned after the enormously successful book clubs, which seek to overcome human inertia about going to the bookstore. Getting your monthly bulb, or bulbs, works the same way. Every thirty days along comes a description of the bulb species selected. If it interests you, you order it, and get the full story of its history and culture, along with a guarantee that it will burgeon into interesting bloom. One month it may be a couple of big bulbs, another a lot of little ones. Of all plants, somehow, bulbous ones most interest us. The usually unexciting-looking, dead-oniony affair, which, often under what seem to be the most inhospitable circumstances, springs to life, grows from green spike to bloom—a dramatic something-from-nothing working up to a climax. Few novels from the book clubs can claim such a record.

FROM the publicity department of the Gulf Oil Corporation comes a story, with pictures, constituting what we assume must be good publicity to the view of some, but to us contains a sad note. At the Gulf Oil refinery in Port Arthur, Texas, six buffaloes are pastured among the tanks and pipelines. Their task is to aid some 100 Brahma and Jersey cattle in cropping the grass. The story reports that for the first ten days on this assignment the bison "grieved", refusing to eat, possibly because of homesickness for the main herd from which they had been separated. We would not venture seriously to suggest that their grief also might have contained some latent and instinctive shame handed down from their proud ancestors of the plains. Fortunately these oil company bison cannot read the tragic history of their kind, or know how far they have fallen from the days when they were lords of the plains. However, after ten days, the sextet went to eating, doing as good a job as a mower on the refinery grass. We do take some pleasure in the information that "the little bison herd has remained proudly aloof from the other cattle." Perhaps that strain of lordly blood does prevail, after all.

We rather enjoy the fact that Judge James H. Crow, Jr., and William E. Deer are both members of the Conservation Advisory Board of the Alabama Department of Conservation.

R. W. W.



What Power?

By BENJAMIN F. TAYLOR

What gave this strange, wild bird
A sense to know its right
To Northland's summer, brief and bright?

What gave it sense to find the way,
And gave it pinion, strong
To fly the weary distance, long?

And with its increase come and grown,
And threat of cold and snow,
What lets this feathered creature know

It best had journey with its young
Back to the Southland's gentle clime,
A safer home for winter time?

PHOTOGRAPH BY HUGO H. SCHRODER

Grandmother loved to fish, so they built her a pond, which became a refuge and home to

Gaddy's Geese

By CHARLOTTE HILTON GREEN

THEY'RE the closest and the mostest geese I ever did see," announced a small second-grader as the teacher and mothers gathered up the class of some thirty children who had been brought from a nearby town to see the four or five thousand Canada geese on the three-acre Gaddy Wild Goose Pond, near Ansonville, central North Carolina.

The birds had, indeed, been close, for although many more geese winter at famed Mattamuskeet Lake in coastal North Carolina, they are not as concentrated, or are they as approachable. At Gaddy's Pond three to four thousand may often be seen at one time, and the geese seem to know they are pro-

tected, so all wildness leaves them. Observers sit quietly on the benches, a few feet from the water, and the geese come to feed on the corn that is scattered on the bank. And they swim and feed in groups of hundreds just a few feet off shore. A visiting agriculturist from Clemson College, South Carolina, once referred to them as "acres of geese."

There is a delightful country-folk story—a sort of "Adventures in Contentment" tale that David Grayson would have loved—in how and why this pond came to be. It is the story of a kindly man building a fish pond because *his mother-in-law*, a little, old, country lady of nearly eighty, had a consuming passion for fishing. She just felt that day lost in which she could not fish. The Pee Dee River was a bit distant; the family felt uneasy about her going there alone, and they could not always be with her. Too, she "could not see the cork bobbing" from the high banks of the river!

So Lockhart Gaddy built a pond, and the nearly eighty-year-old grandmother—sometimes alone, sometimes with the family of grandchildren, and even "greats"—fished happily, and safely, from the banks of the new pond. And she fished almost up to her death, just before her eighty-seventh birthday!

Once Mr. Gaddy was a hunter. He kept live Canada geese (with clipped wings) as decoys, which was legal at that time. One pair he had had for twenty-two years. "Mr. and Mrs. Bowlegs" they were named, and, after the pond was built, they raised

Mr. and Mrs. Lockhart Gaddy watch some of the Canada goose guests at their Wild Goose Refuge near Ansonville, North Carolina.



PHOTOGRAPH BY MRS. LOCKHART GADDY

Grandmother, Mrs. Pattie Ross, for whom the pond was built, fishes attentively on its bank at 85, with a granddaughter and two great-grandsons.



PHOTOGRAPH BY LEWIS P. WATSON



PHOTOGRAPH BY LEWIS P. WATSON

A group of second-graders from the school in Norwood, N. C., squat on the edge of Gaddy's pond to watch the waterfowl. Many delegations come from schools in the area.

a family on it. But eventually they were shot by hunters. Now there is a "Bowlegs, Jr.," who has acquired himself a mate.

The Canada geese first came to the pond in 1937, and there were nine that year. The next year fourteen geese came; the third year thirty-two; then seventy-five; finally "they just came by hundreds and the last couple of years by thousands. Five thousand is the peak number—so far, at least."

Today Mr. Gaddy is no longer a hunter. He is a conservationist and a wildfowl lover—and is getting far more kick out of it than he ever did out of hunting. The refuge is now both the Gaddys' main interest and avocation, and the five thousand geese are their beloved children. Many of them they recognize and have named.

The pond, originally two acres, was last year enlarged to three to accommodate the increasing number of geese, and is surrounded on two sides by pines, oaks, sweet gums, red maples, lovely in autumn coloring. On the early March day of my visit the red maples were in flower, etched against a blue sky flecked with white clouds, and a cardinal in the maple was singing his welcome to spring. The other two sides are more open, sloping towards the water. In the fall the slopes are planted to rye, which lasts the returning geese about six weeks.

"Tis a year-round family resort," says Mrs. Gaddy,

who, with Mr. Gaddy, comes every day to watch the geese and to visit with the increasing number of people who come from near and far to see the birds. "For nearly six months the geese have the pond; the rest of the year we have it for fishing, and for swimming for the young people about. And though we all love to fish, we enjoy having the geese even more."

With about 850 acres in this one tract, and owning all land about the pond except that beyond one side of it, the Gaddys are able to furnish quite a bit of protection to the geese. Too, the North Carolina Department of Conservation and Development became interested and helped by declaring the place a Wildfowl Refuge and prohibiting hunting within a half-mile of it. It is hoped that this will be increased to one mile. Of course, during the hunting season, there is some shooting when the geese are off the refuge and beyond the protected area, and some injured birds get back to the pond, some to recover, some to die.

The Gaddys insist they have themselves observed the oft-told tale of how a wounded goose, still able to fly, is assisted by others who fly beneath it, the force of their beating wings helping to keep the injured bird aloft. Thus they lead it back to the refuge.

In general, however, the whole countryside has become "geese-minded" and is both interested in and proud of their "local Jack Miner", who is put-

ting Ansonville on the map. The geese do go out to feed in neighboring fields, but there has been little complaint from farmers about damage done. Most of the feeding, it is said, is done by the geese clipping the sprouting oats, wheat, rye, barley, and that only makes the plants come up again in thicker tufts. Of course, when the sprouting grain is pulled up by the roots, there is damage, but there seems little of that.

For a time the Federal Government assisted in the feeding, supplying some funds for the privilege of banding, about 850 geese having been marked. There are also quite a few of the Jack Miner-banded birds, easily recognized by the larger band, which must be big enough for the typical Miner Biblical verse. One can spot those bands, through binoculars, on some of the geese that come up on the banks to feed. This year, however, the government has not supplied any funds, giving as a reason a reduced budget and no provision for assistance to private refuges.

There is, naturally, some criticism, both by the public and some wildlife officials, as to the wisdom of maintaining this small pond as a refuge. Because of the heavy and false con-



PHOTOGRAPH BY LEWIS P. WATSON

PHOTOGRAPH BY HUGO H. SCHRODER

Geese coming in to land on the pond after a feeding expedition, and, left, close-up of the geese sailing about, or feeding. Note the bird in the foreground a bit right of center. Bottoms up and no mistake!



centration of geese in such a small area, they insist, disease might get in and become rampant. And what will become of the place when the Gaddys are gone? As to the last, the Gaddys have their own plans, but are not willing to announce them as yet.

As to the first, it is granted that it is a small pond for the large numbers of geese. But then, is not any refuge with its large numbers of protected birds a "false concentration?" And so far, at

least, the Gaddy geese are in a mighty healthy and contented state, and, since they are there only in the colder months, the danger of disease is regarded as remote.

Against these objections is the great interest in the geese—and in the few ducks that are there—that has been aroused in inland North Carolina and nearby upper South Carolina. Here the geese are so much more accessible, so much more easily seen and in such greater numbers, close up, than they are on the great sanctuaries and refuges on the Atlantic and Gulf coasts. School children, from the second-graders of our visit, up through the grades and high schools, are brought by parents and teachers, in small groups and large groups, in private cars and in school busses, from as far away as fifty miles. And I know one indefatigable Girl Scout leader of Raleigh who took her troop to the refuge by way of a 130-mile bus trip, and then a two-mile hike out to the Pond. And they will want to go again!

As for children, probably two hundred see these geese to every child that may see them at the larger but more remote sanctuaries, and these children are not only becoming interested in the wildfowl, they are becoming aware of the value of wildlife and conservation in general, and of some of their problems, too. They are learning "Bird Geography", also, for here is an opportunity for their teachers to explain something about the winter range and the far distant nesting regions of Canada geese, as well as their migratory routes, and the necessity for safe areas during these times, in particular.

Not only children are interested, but word of the "Goose Pond" has spread, and more and more of the north- and south-bound traffic detours to "see the geese we've heard about." The register shows visitors from thirty-one states—from as far away as Maine and Florida, Colorado and Texas, Washington, Oregon and California; from six foreign countries, including three continents!

Sundays are usually the big days—two Sundays each had 1500 visitors. On week days there are fewer visitors, but many of the neighbors "drop in", and, of course, the larger number of school children are brought then.

This year, for the first time, the Gaddys have felt they must ask an admission charge (only twenty cents) to help defray the cost of feeding the geese, which eat about four bushels of corn a day on normal days, but require twenty bushels a day during the severe snow period, when fields are covered.

But the Gaddys make no charge to local people, nor to any school group. They are all welcome to come as often as they wish.

Actually, the best time to see the geese, say the Gaddys, is on cloudy or drizzly days, for then they are more active, coming and going rather continuously. On sunny days the geese go out at dawn to feed, coming in between nine and eleven; some of them then tuck their heads down on their shoulders and take a nap. But the majority are awake, swimming and feeding and keeping up a constant clatter of honking. About six they go out to feed again, and on moonlight nights they are also out.

Quiet and order are maintained about the pond; nothing is allowed to disturb the birds. Many visitors hopefully remark that they wish something would startle the geese into flight, but Mr. Gaddy is adamant that no false disturbance be created. If the geese get badly frightened, he explains, they sometimes take days to settle down again.

There are a few ducks on the pond, some ringnecks, mallards, black ducks, a shoveller, a merganser, a redhead, and last fall, for a few days, a cinnamon teal. One can get good close-ups of these, too, for often they swim close to the shore or come up on the bank with the geese to feed.

And there are "Mr. Blue Jim", the blue goose, and her young one. Undoubtedly "Mr. Blue Jim" is a female, although both sexes look alike. "Mr. Blue Jim" came to the pond nearly three years ago, as an immature, and was then named. Through the winter the Gaddys were fascinated at seeing the white gradually appearing on the head. The first year they kept the blue goose's wings clipped, and so it spent the summer on the pond. But the following spring the blue goose left for the North with the northern-bound flights. But last fall "Mr. Blue Jim" returned, and with a youngster in immature plumage!

By early March the white shows plainly on "Jim Jr.'s" head. And from the devoted attention paid the youngster, and the dependence of the youngster on the older goose, I think "Mr. Blue Jim" should henceforth be known as "Mrs. Blue Jim." The two are inseparable. When one swims, there is the other close by. When Mrs. Jim comes up on the bank to feed, along trails the youngster; when she flies, Junior flies also. The two are easy to spot among the geese, and seem to stay near the bank with the observers most of the time, and are great favorites with the onlookers. Children, in particular, who have been there before, eagerly look (Continued on page 498)

Snow Geese at Dusk

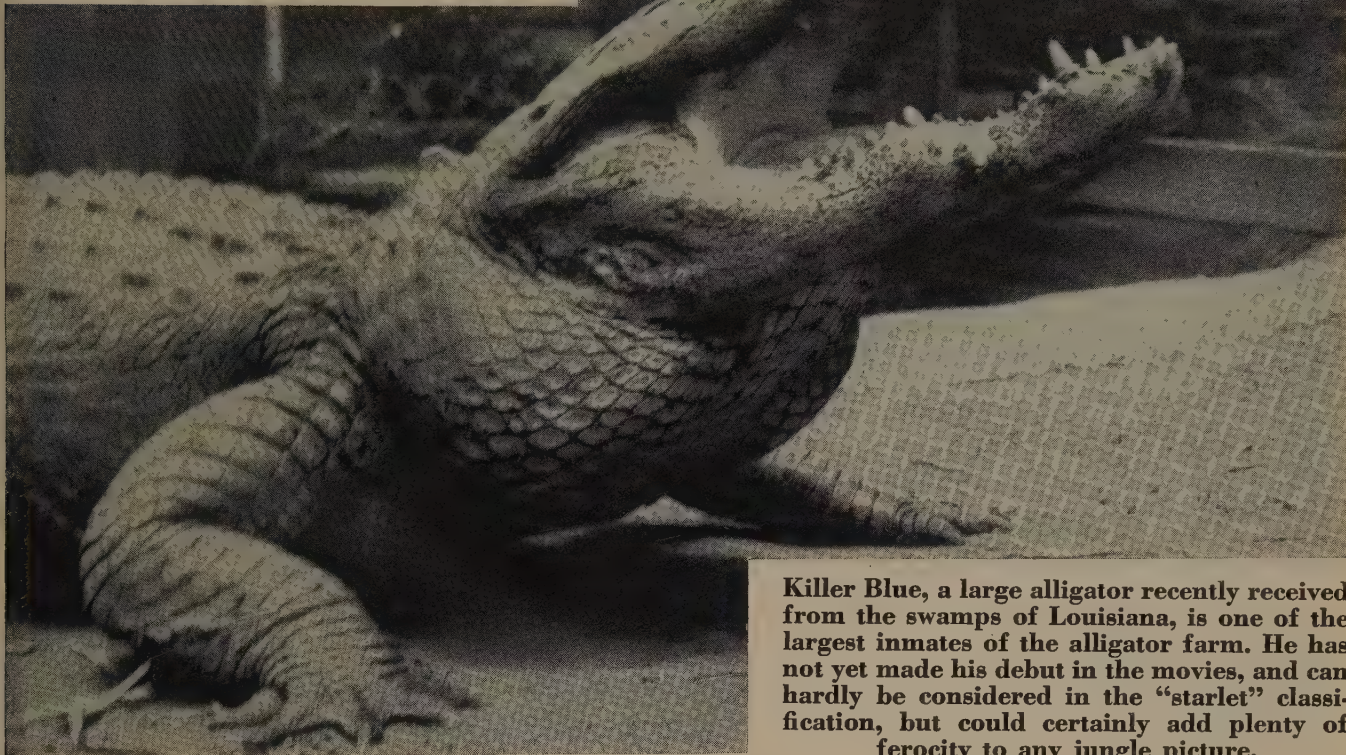
By MAY ALLREAD BAKER

Upon their curving, migratory flight,
Bathed in the rosy tinted afterglow,
They strain their eyes to glimpse the welcome sight
Of some secluded lake. Then, circling low,
And ever lower in the darkling sky,
They plunge to meet the cool and frothy waves.
Rejoicing with their wild and lonely cry
As every snowy breast the water laves.
Along the sand-strewn, shallow water's edge,
They presently shall find both food and rest.
And sleep secure amid the friendly sedge
While purple twilight deepens in the west.

Movie Dragons

By WELDON D. WOODSON

Photographs by Keith Boyd



Killer Blue, a large alligator recently received from the swamps of Louisiana, is one of the largest inmates of the alligator farm. He has not yet made his debut in the movies, and can hardly be considered in the "starlet" classification, but could certainly add plenty of ferocity to any jungle picture.

SHOULD you see, in a Tarzan picture, a giant alligator in close pursuit of an African native, who seems to be frantically swimming to get out of range, the chances are that the beast is none other than "Old Girl." She is a trained alligator from the California Alligator Farm in the north part of Los Angeles. "Old Girl" is not much to look at, for, in battles with her fellows, she has lost some of her lower jaw and her left front leg. In motion picture swimming scenes, however, she ranks among the best.

This alligator, however, is not the only star housed at the farm. The most pleasing all-around actor is Billy, so gentle that Clarence J. Sweet, the head trainer, invites visitors to set their youngsters on Billy's spacious back, take hold of the reins and go for a ride. On such occasion, parents invariably snap pictures for the family album. Among the movies in which Billy has played are "Dr. Cyclops", "You Can't Cheat an Honest Man", "Tarzan and the Amazons" and "Swamp Fire." He is perfect with the exception of his right foot, broken while doing his stuff in the picture "Roman Scandals." The foot readily healed, but was left considerably enlarged.

As might be expected, motion picture work with alligators has produced many unique experiences.

It was mid-winter when Paramount was filming "Her Jungle Love," starring Dorothy Lamour. The property man telephoned in an order for alligators to the late Francis V. Earnest, owner and founder of the farm. Earnest informed him that his performers were in a period of seasonal torpor, a sort of hibernation, and would be until spring. This did not discourage the Paramount property man. He said to go ahead and truck the animals over; he would do the rest. When the alligators arrived they were put—356 in all—in a tank equipped with steam pipes. With the water at seventy degrees, the reptilian actors became very lively, did their act, and then returned to their winter slumbering. In one of the last interviews Earnest ever gave, he told me that the alligators were none the worse for their premature and temporary awakening.

At that time, I asked Mr. Earnest if his life had ever been endangered as he handled his charges, for some are ten to twelve feet in length. They seem most ferocious when they open wide their huge, cavernous mouths. Once, he said, he wore a pair of alligator boots into a training cage. "A big bull 'gator, scenting a probable grandfather in my footwear," he added, with a smile, "seized my left leg. Fortunately, I was

able to work myself out of his powerful jaws and escaped with only minor injury." Usually, however, the animals are quite docile, despite their forbidding appearance.

During the war, Mr. Earnest heard that, because a certain locality in Louisiana was being taken over for war maneuvers, a collector would be forced to destroy a large stock of alligators. He made a frantic effort to arrange for their transportation to Los Angeles, but did not succeed in time.

Other than obtaining individuals from the swampy parts of the southern states, all the way from the Everglades of Florida to southeastern Texas, the farm occasionally gets specimens from excited persons who discover these creatures in their yards. These are escaped pets. An urgent call over the telephone frequently pictures the animal as of gigantic proportions. Sometimes the whole neighborhood becomes aroused, and someone from the farm is urged to rush out and capture it. Often as not, the monster turns out to be no more than a foot or so in length.

The farm itself consists of twenty small lakes, where the alligators are kept. Owing to their cannibalistic tendencies, the animals have to be segre-

gated according to size, the young ones in one lake, those a little larger in another, and so on up to the giants. When one individual is particularly belligerent, it is partitioned off by itself. The 'gators in the California farm's ponds can be seen every day, although in winter they are inactive and eat very little. As the weather warms up, they begin eating lightly, but, with the coming of hot summer, they are ravenous. An attendant throws in large pieces of meat. Immediately, a number of alligators take hold and roll over and over, thus twisting off pieces of food.

During the spring of the year, the males can be heard to bellow loudly. This is the mating season. The maternal parent subsequently works together a pile of mud, sticks and grass, which is the nest. One of these can be seen at the farm. It is only a model, however, for here the eggs are hatched in an incubator. In the wild, the eggs—as many as fifty—are laid in the nest and carefully covered over with debris. The warmth of the sun, plus the heat generated by decaying matter, incubates them. In about eight weeks, they hatch, the young measuring approximately eight inches in length.

From this small dimension, alligators have grown to a length of as much as sixteen feet. Ditmars says that there was a time—long since gone—when Florida individuals fourteen and fifteen feet long were no great rarity. Within recent years, however, he doubted whether there were any that measured up to that. In fact, there are only a few twelve-foot specimens left. The largest exhibited in the New York Zoological Park was "Old Mose", which was a fraction under the thirteen-foot mark. Not so many years ago, the California Alligator Farm had one of gigantic size, which went under the colorful name of Okeechobee. His stuffed body is on exhibition there now. His successor, El Diablo, was fourteen feet, one and one-half inches in length when he died in 1946.

The idea of the farm originated in 1900 when Earnest, an enterprising young man, journeyed through the swamps of Louisiana and failed to see a single alligator. He started to investigate, and soon learned that in other parts of the country, where



A South American iguana is an interesting and harmless lizard. By devices of trick photography, however, it can be made to serve as a giant dragon or great prehistoric reptile.

Pontchartrain Billy is one of the most famous of alligator actors and a most tractable fellow, too. Here he is being ridden by David Boyd, whose father took the pictures here.

at one time the animals flourished in great numbers, they were fast being killed out by hunters. Between 1880 and 1894, it has been estimated that 2,500,000 alligators were killed in Florida alone. Some were slaughtered for their hides; others during that period—and also at the present time—were shot at by irresponsible “sportsmen” who use them for target practice. Also of interest is the fact that, according to a report that covered 1890, about 250 pounds of alligator teeth were sold to dealers, who polished and re-tailed them to souvenir collectors. Some alligator eggs are eaten by humans, and large fishes, turtles and other natural enemies prey upon eggs and young. Natural controls, complicated by exploitation by man, have pushed the big reptiles to the verge of extinction.

Francis Earnest decided, however, that he could help, some, by rearing alligators in captivity. He was convinced, also, that they would prove an attraction to hosts of people who would never have a chance to see them in their native haunts. It was not until 1907, however, that he actually established the California Alligator Farm, the first animal being purchased from “Alligator Joe” of Hot Springs, Arkansas, who was in business with him for two years. From this small beginning, Mr. Earnest, together with his wife, Gladys Jane DeMarrs Earnest, and their son, Francis V. Earnest, Jr., built up the farm until, today, it has more than 2000 big, small and medium-sized alligators.

A show for visitors is conducted every day throughout the year. Among the attractions are Napoleon and Josephine—familiarily called Nap and Josie—two large individuals recently shipped from the



swamps of Louisiana. Moss still covers their backs and sides, and it will take a year before it can all be washed off with a daily bath from a hose. There are Jerry and Jimmy, who will put on an act that consists of sliding down a chute into a pond of water. Jack, Ben, Sadie and Evangeline II are all screen performers.

Not all of the motion picture monsters are provided by alligators, however. Three-and-a-half-foot South American iguanas from the farm appeared in “One Million B.C.”, as well as in “Tarzan’s Secret Treasure.” Filmed close up, they showed on the screen as dinosaurs and dragons many feet in length.

Recently an alligator arrived at the farm and weighed in at more than 500 pounds, measuring thirteen feet and nine and one-fourth inches in length. He had been found so far back in the Louisiana swamps that, upon lashing him to a plank, a crew of men carried him for five days before reaching a place where a wagon could get in. The man who captured him asked the management that, as a personal favor, they name him “Killer Blue.” And they did just that. Any day now he will scowl his ugliest best in a tryout for motion-picture starring honors.



On Watching a Snowflake Melt

By GERHARD FRIEDRICH

Such is life—a perfect crystal!
But the finely woven pattern
Fades into a drop of water
In the keen observer’s hand.



PHOTOGRAPH BY STEPHEN ZAVODA

The least weasel, the smallest predatory mammal in the world, so far as is known, peeks at the camera. Forty-nine exposures resulted in pictures of the knothole; the fiftieth yielded this rare picture.

Better than a Mouse Trap

By BERTHA LOUISE GOETSCH

IT WAS a cold, snowy November day when Grover Keplinger was hauling corn shocks from a field near Canton, Ohio. Tearing one apart, he noticed a tiny, mouse-sized, white-furred animal dart from it. Being a student of Nature, he at once gave chase, determined to capture the strange animal he had never seen before. With the help of his dog, as well as the deep snow, he was able to catch the diminutive creature with his heavily gloved hand. Soon he had it caged in a fine-mesh, wire coop where it was to live until its identity was positively established as that of a North American least weasel, *Mustela rixosa allegheniensis*.

It is probably safe to guess that Keplinger is the only human that ever caught one of these elusive, lightning-quick animals by hand, for it usually avoids man successfully. A hollow piece of wood was immediately placed in the wire cage, otherwise the terrified midget would have killed itself in its frenzy to escape. It darted into the hollow wood at once, defying anyone to get it to emerge from the hideout.

It was soon discovered that the captive refused to touch dead meat, but required it fresh, and on the hoof—literally. A drive to catch live mice was started. When one was dropped into the cage, the weasel scented it instantly. With unbelievable swiftness it darted out of its hiding-place, grabbed the mouse by the throat, pierced it and quickly dragged its prey into the hollow wood. Its fare consisted of two live mice per day during the time that it was in captivity.

The least weasel has been known only since 1896, when the naturalist Bangs described the heretofore unknown species. It is the smallest known beast of prey in the world, being smaller than any good-sized meadow-mouse. Its head and body measure six inches, and the tail is barely more than an inch long, and, unlike other weasels, does not have a black tip, either summer or winter, except for a very few scattered black hairs in the tail-tip. Another means of identification, besides the lack of black-tipped tail, is its very small skull. It has forty-two teeth in its wee jaws, ten on each side of the upper and eleven on each side of the lower. Two adult males were found to weigh forty-six and thirty-seven grams each. Females are slightly smaller than males.

The least weasel can pass with ease through an opening the size of a nickel. In summer it wears a dark-brown coat, the underparts of the animal remaining white the year around, without a yellow tinge. The weasel molts in the fall at the approach of winter, requiring from three to five weeks to complete the change. The winter coat is white, except for the scant, few black hairs at the tail-tip. By early March the fur begins to show brown hairs again, and by April it has again assumed the brown summer pelage. The presence or absence of snow seems to be a determining factor in the animal's donning the protective "ermine robe". Wm. J. Hamilton, Jr., states that, among the Allegheny least weasels, few seem to change to a white winter pelage, including

those in the regions of Pennsylvania and Ohio. He also states that the majority of them, in this area, acquire a slightly paler brown coat with the approach of winter, with an occasional ermine-coated one, as was the one caught by Keplinger, except for a speck of brown on the forehead.

The least weasel is found from Hudson Bay to the coast of Alaska, in Pennsylvania and south in the Alleghenies to North Carolina, and in Ohio, Northern Illinois and Indiana, Wisconsin, probably Minnesota, and in Saskatchewan and Alberta and Mackenzie. So far as is known, the least weasel does not appear to be common in any part of its range. In Pennsylvania, where thousands of weasels have been trapped for bounty over a period of years, relatively few least weasels have been caught. Because of its diminutive size, this tiniest and most elusive carnivore is rarely seen. Usually its presence in a community is not known unless it is caught in a trap. One least weasel became quite tame after having been trapped and injured. Its benefactor nursed it back to health, after which it remained about the woodshed of the man who had befriended it.

One interesting observation of the activities of this weasel involves the fate of three large colonies of field mice, which moved into their winter quarters in considerable numbers in the fall of the year. The following February a least weasel invaded each mouse habitation, quickly destroying all the inhabitants. The invader then appropriated these residences for its own, raiding other rodent centers in the vicinity. At least four kinds of mouse remnants were found in these quarters in the spring. One observer in Iowa states that he has found the range of males to extend to about two acres from the home den. This suggests the possibility of territorial behavior. Much remains to be learned about the life history of this interesting and beneficial beast of prey. Since the least weasel is so exceedingly small, it can penetrate the runways and burrows of mice communities, and, with its quicker-than-a-bullet movements, "blitz" the mouse population in double-quick time.

It is significant that wherever the least weasel resides mice are kept in control. The diminutiveness of this animal makes it incapable of killing poultry, and it is established that it destroys nestling birds. We do know that it hunts by scent, can climb, and can

swim with ease. From present knowledge this little animal is entirely beneficial to man's interests and deserves full protection.

The most common food of the least weasel is mice of all kinds, and shrews, moles, meadow voles, and such. It is also highly insectivorous, devouring many grasshoppers, crickets, beetles, as well as earthworms.

Little is known of the home life of this rare mammal. Nests have been found beneath corn shocks and in shallow burrows bordering streams. The few that have been found were composed of grass and mouse fur. Apparently the breeding habits of the least

weasel differ from all other weasels. Young with unopened eyes have been found in midwinter, while lactating females and nest young have been found in Pennsylvania during October, January, and February. The litters discovered numbered from three to six. The mother was always present. From this we may assume that their young are born at various seasons, and it is likely that there is more than one litter per year. If this is true, the least weasel is out of the ordinary among mustelids. It is not known whether the least weasels have the sanitary inclinations other weasels have in house-breaking their young before their eyes have opened!

This animal's habitat is known to be on the highest mountains as well as meadows, in coniferous forests, stone fences, hollow stumps, corn fields, banks of streams and possibly woodlands.

It is said of weasels that they are easily killed by excitement, and also that they are seized with convulsions, almost at once, if placed in strong sunlight, since they do not indulge in sunbaths as do many other animals. One author confesses that the weasel odor is far more offensive to him than that of the skunk.

When wildlife photographer Stephen Zavoda accepted the assignment to photograph Mr. Keplinger's captive, he did not know it would prove to be a major problem to capture it with the camera. Attempts to "shoot" the rare specimen failed when a live mouse was dropped into the cage. The least weasel moved too swiftly. It was then decided to photograph the animal by urging it to come through a knot-hole, no larger than a half-dollar, in a piece of wood. The camera having been focused on the hole, the photographer's helpers began tapping vigorously on the wood to dislodge the crea- (Continued on page 498)

Metamorphoses

By M. CLIFFORD HARRISON

What though tall trees have shed their leaves
And branches claw the sky?
What though the weeping willow grieves
That robins southward fly?
What though forlornly yellow sheaves
Muse that the year must die?
The luscious winesap blushes red;
Persimmons now are sweet;
On autumn's wine-like air we tread
As friends of old we greet,
And fireplace coals glow in their bed
In cheerful home's retreat.
What though an angel's tears we see
Within the falling rain?
Cold clouds will break, and in high glee
Sunshine will mock our pain.
The God of fall will rise to be
The Christ of spring again.

THE sleeping habits of animals is a comparatively neglected subject of natural history, and the reason, of course, is not far to seek. Even if their enthusiasm was equal to it, the practical difficulties in the way of making the necessary observations are enough to prevent most Nature students from taking sleep in the wild as one of their pet subjects. Nevertheless there are on record sufficient observations by various workers to give us a fair idea of how the wild folk go to bed.

The first thing that strikes the investigator is the extraordinary variety of sleeping habits. The ringed snake, for example, starts its day at noon, is asleep again by two o'clock and sleeps around until the next midday, while a rabbit has sixteen or so fairly regularly spaced naps spread over the twenty-four hours. The British thrush is active for about nine hours during the winter, but in summer its day begins at two in the morning, and it does not retire until nearly ten o'clock at night.

Some birds are light sleepers, "exploding" from their sleeping quarters as soon as danger approaches, but such a bird as the Australian frogmouth is such a sound sleeper that it can be lifted from its perch without being awakened. A somewhat amusing contrast is seen in the difference between the sleeping habits of bobwhites and wild swine. A covey of bobwhites passes the night sleeping in a circle with their heads turned *outwards*, but a sounder of swine, also sleeping in a circle, point all their heads *inwards*.

Another great difference to be noted about the sleeping habits of animals is in the construction (or lack of it) of beds. On the whole there is little bed-making among birds, and many mammals just smooth down a small area and then go to sleep.



Orang-utans invariably make their beds in the tree-tops.

How Animals Sleep

By FRANK W. LANE

Illustrated by Olaus Murie

Gorillas, on the other hand, not only go to considerable trouble to make their beds, but they seldom sleep in the same shelter two nights running. This is because their appetite is so great that they quickly eat up all the available young shoots in which they delight and have to move on to fresh feeding grounds several times a week.

A gorilla family sleeps together in an alfresco dormitory. Frequently a moss or vine canopy acts as a tent. Several young branches are bent together, and, by intertwining these, a platform is made on which are placed sticks and leaves. More than twenty-four complete "knots" have been counted in the creepers and saplings used by the gorillas in the construction of a bed. Incidentally, a woman traveler said she thought she would have

found any of these gorilla beds comfortable enough for her to enjoy a good night's sleep.

Orang-utans, who are arboreal in their habits, invariably make their beds in the tree-tops, sometimes forty feet above the ground. When an orang has decided upon its tree it takes up its position in a fork well screened by foliage. Reaching out its long, hairy arms, the animal snaps off leafy branches and lays them down with the broken ends sticking outwards. When finished, its bed may be four feet in diameter and is usually quite flat on top.

A taxidermist, who was measuring a shot orang, said he found it impossible to straighten out the fingers without cutting the tendon in the palm of the hand. The reason is that, while the natural position of the human hand at rest is with the fingers slightly bent, that of the orang is with the fingers tightly closed. This characteristic is of obvious advantage to the tree-sleeping orang. When comfortably settled on its home-made bed, it stretches out its arms, and



its fingers automatically lock on the nearby branches. Thus the orang can sleep securely, and, although the winds blow ever so strongly and rock it in its tree-top cradle, it cannot fall out of bed.

Particular care is taken in the best zoological gardens to see that the sleeping arrangements of animals are suitable. In the Munich zoo, before the war, blinds were put up outside the sleeping-boxes of the apes and monkeys to make sure they slept the full twelve hours to which they were accustomed in their dark, home jungles. In the same zoo each ape was supplied with its own blanket, which was sent to the laundry every week.

Elephants are sometimes seen tightly chained. This is supposed to give them a feeling of security, and in India their keepers sometimes fashion a chain of straw. This is intended to enable their charges to pass the night in peace and without fear that their beds may be destroyed by other elephants.

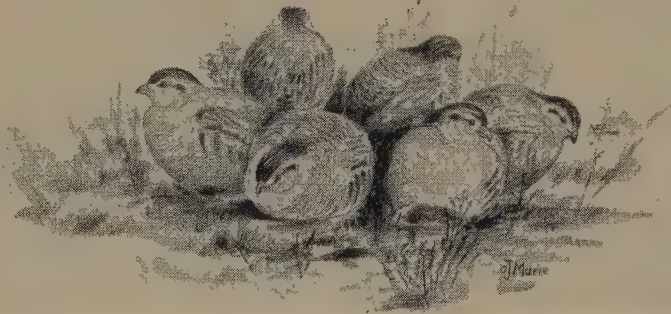
After a nap on the ground an elephant sometimes rises by slowly rocking its body from side to side until sufficient momentum is achieved for it to roll up on its feet. When there are ant-hills in a district an elephant will often rest at the base and make use of this to help it to get up in the morning. Not all elephants lie down to sleep. Louis the Fourteenth of France had one that did not lie down for five years. When it went to sleep it supported its head by thrusting the tips of its tusks into two holes it had worn in the stonework of its enclosure.

Some of the sleeping habits of elephants have been revealed by a study of those employed in the great

Barnum circuses. It has been found that the herd always posts a few sentries. Of thirty-four bull elephants in one of the circuses, twenty-nine slept peacefully on the ground but five remained standing. As two of those standing dropped to the ground, two others rose and took their places. This changing of the elephant guard went on as regularly as if it were part of the big-top performing routine.

Elephants snore loudly and appear to suffer from nightmares, which cause them to trumpet and bellow uproariously. But such accompaniments of sleep are not the prerogative of elephants and humans. Dreams seem to come to most of the higher mammals. Sleeping dogs, apes, cats, horses and other mammals utter sounds and make movements that, in man, would be regarded as indicative of dreaming. And anyone who has ever kept a dog knows they can snore!

When disturbed, the ruffed grouse will burst out of its bed through the snow surface, and, below, a covey of partridges passes the night sleeping in a circle with their heads outward.



Every mammal with a comparatively highly developed brain needs a fair amount of sleep. A dog that cannot get sleep dies in five days; lack of sleep kills it more quickly than lack of food. And there is considerable evidence that enforced wakefulness can be fatal to other mammals of high intelligence. Experiments have been made with the toxic substance that circulates in the blood of animals deprived of sleep. When this substance was injected into other animals it caused them to fall into deep sleep.

The popular idea that birds sleep on branches of trees with their heads tucked under their wings does not hold true for many species of birds. In regions of abundant snow the ruffed grouse has the habit of plunging into a snowdrift from the wing and spending the night in a ready-made igloo. That queer New Zealand bird, the kiwi, sleeps during the day in the shelter of an underground burrow. The bat parakeet owes its name to its habit of sleeping hanging head down and clinging to its perch by one foot. Some species of swifts sleep clinging to each other in a great ball, looking very much like bees swarming.

Nearly all birds dislike sleeping in the wind. If compelled to do so, they like to face it. This position keeps their feathers down. Normally, a bird puffs out its plumage when going to sleep. This action helps to retain the warmth of its body as, by interspersing air (a bad conductor of heat) between its feathers, it prevents the natural heat from escaping. A similar reason no doubt lies behind the common habit among various mammals of curling up during sleep, although probably the desire to keep the undersides and extremities warm is another factor.

Many bird-lovers must have wondered why a sleeping bird does not topple off its perch. The reason is that its foot is made on a principle similar to the orang-utan's hand. Attached to the cords that operate a bird's toes is a long tendon. It runs nearly the whole length of the leg and broadens into a muscle on the front of the thigh. When the bird sits down, its knees and ankles bend and automatically tighten the tendon. This tendon is therefore kept on the stretch and contracts the bird's toes, which thus grip tightly. The bird is then virtually locked to its perch. Dead birds have been found still gripping the perch on which they settled for their sleep, which fate decreed should be dawnless.

Birds whose home is the sea or inland waters sleep in various ways. Gulls seem to take naps while floating on the waves, and, according to some observers, these birds can sleep on the wing. The same has been asserted of the albatross.

Ducks and swans frequently sleep upon the water, and instances are on record of their being found frozen in by a sudden cold snap and unable to extricate themselves from the ice. Sooty terns are able to rest on water, but they cannot stay for more than a brief nap. It has been ascertained that, after a few hours, they become water-logged and are quite unable to rise from the surface. There is evidently something defective in their water-proofing.

Although it is questionable whether fish sleep at all in the same sense as mammals and birds, some species exhibit changes in behavior that appear to be related to sleep. One of the mouth-breeders tucks its young into its mouth when night approaches. As soon as the lights are turned out in an aquarium the marine wrasses cease swimming to and fro and, turning over on their sides, rest on the bottom of their tanks. Other inaction quite like sleep has been seen.

Fish that swim in mass formation during the day sometimes separate at night. In one species, the fish, after separating, all face a different point of the compass. When disturbed they quickly reassemble.

Dr. William Beebe has described several hundred puffers sleeping on the sand in the shallows near shore. "Two or three were piled half over one another," he reports, "while five or six would sometimes be lying head to tail or side by side. At one place we counted sixty within range of the light. They were sleeping right side up, not buried, but nearly all with a thin coating of sand thrown over

their backs. This in no way disguised them." While Dr. Beebe was watching them a large sting-ray swam silently over the dormitory and about thirty of the puffers awoke with a start and rushed about in all directions, banging blindly into the rocks and weed.

Several mammals have developed the ability to sleep on water. One of these is the hippopotamus. Instead of coming out on to dry land hippos frequently bask in the sun on the surface of the great African rivers, with their huge heads pillowed on their neighbors' backs. The same thing happens

when they sleep on the banks, except that the big fellows have an unpleasant habit of using the youngsters as pillows.

W. H. Hudson said that what we call sleep in an insect resembles the somnambulistic state rather than sleep as we know it. Proof of Hudson's contention is found in the behavior of a butterfly when disturbed at night. A sleeping butterfly can be picked off its blade of grass, and when replaced its feet will grasp firmly although apparently asleep. A butterfly can be plucked from its resting-place and tossed into the air, and it will slant down until it touches a blade of grass and then fasten itself once more. Yet it has not awakened; its actions are purely automatic—or somnambulistic.

Wasps appear to sleep well. Their choice of bed varies greatly. Sometimes they cluster in scores on a beam in an old barn, others choose a flower head or leaf, while mother wasps crawl inside a hole they have been digging during the day and close the bedroom door by kicking dirt against the entrance to the hole. Some species of wasps seek out the cavities of old stone walls and go to sleep lying on their backs like humans. Bumble-bees are also good sleepers. Edwin Way Teale found, by mark-

(Continued on page 498)

NATURE MAGAZINE

Unau! Ai!

By V. CASSIDY

A three-toed sloth met a two-toed sloth underneath a limb.
The three-toed sloth was a female sloth; the two-toed sloth, a him.

Unau! Ai! Who knows why
Sloths do what they do?

The three-toed sloth and the two-toed sloth were slothful
sloths and so it took them both about a week just to say hello.

Unau! Ai! Who knows why
Sloths do what they do?

The three-toed sloth and the two-toed sloth always wore
a frown.

They thought that they were right side up and the world
was upside down.

Unau! Ai! Who knows why
Sloths do what they do?

Our Forgotten Supermen

By EDWIN D. NEFF

Photographs from the Smithsonian Institution

This is the first of three articles, bringing up to date, in popular terms, what we now know of prehistoric Man.

NOT long ago a small boy in a Washington, D. C. suburb upset the whole town by getting lost in the woods. He had been reading about Superman, and wanted to try his hand against gorillas, lions and tigers. Instead, he captured only a bad case of

sniffles, and threw a terrible scare into both of his parents.

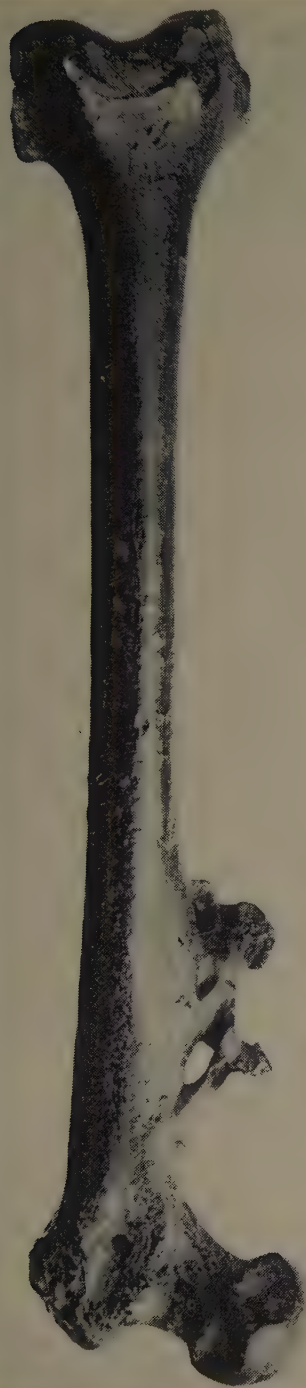
Think of it! Junior alone in the woods for a few hours. Outdoors in the dead of winter without his snowsuit. Junior's Mommy and Daddy insisted on four days' hospitalization.

Of course, Junior was only a small boy, but his misadventure pretty much tells the sorry state modern man has reached. Collectively, he is formidable—with his ships, and planes, and guns, and atom bombs. Alone, he is a poor thing, a thwarted homunculus, helpless outside his incubator cities of concrete and steel. Modern man is a specialist. Perhaps he can do one or two things very well. In return, he must lean on a whole lot of other individuals who can do one or two other things well. This is civilization.

Hence modern man needs to read about Superman because he knows his helplessness, much as he hates to admit it. He is vain of his clothes, but he cannot mend a handkerchief. He rides in beautiful and swift machines, but has trouble when he fixes a lawnmower. Although he could not live a week without elaborate shelter, he falls on his face when he tries to erect a pup tent!

Yet this is mighty *Homo*

Casts of the evidence from which anthropologists have reconstructed the Java man, who probably lived on the volcanic slopes and plains of ancient Java, then a part of the Asiatic mainland, 300,000 years ago.



Pekin Man, or *Sinanthropus pekinensis*, as reconstructed from evidence found in the region around Peking, China.

sapiens, who only 50 years ago was outraged at the confused suggestion he had descended from the apes. Even today, when he visits a museum, he sneers at the low forehead, flat nose and bull-neck of his ape-man great-granddaddy, and is mighty pleased that he has come so far.

Well, has he?

Let us shatter the glass museum case. Let us try to bring these blackened and pieced-together fragments of teeth, jaws, bones, and skulls alive. Perhaps if we can peer behind the curtain of time, and catch a glimpse of these old men, we may admire them more and ourselves less.

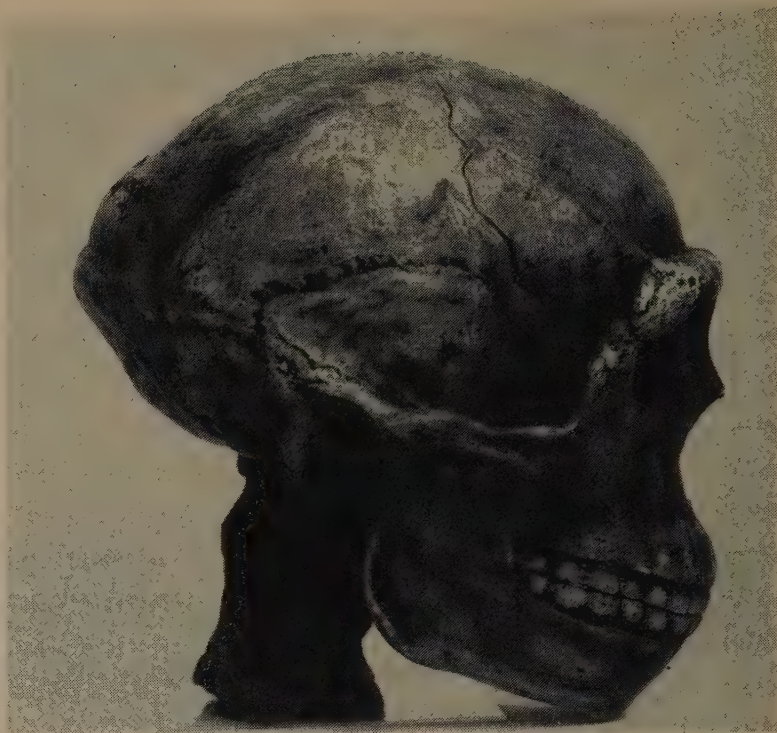
We might begin our story with three teeth—giant teeth, found by a brilliant Dutch anthropologist in a Hong Kong drug store. The druggist was selling them for “dragon’s teeth”, supposed to be good for what ails you. But the scientist, Dr. Von Koenigswald, had a sharper eye. He decided the first tooth belonged to a gigantic ape, and gave it a name—which means just that—“*Gigantopithecus*.” The other two teeth were less worn. Together with additional evidence, the tooth convinced a scientific colleague of Dr. Von Koenigswald that they were human. The colleague was the late Dr. Franz Weidenreich of the American Museum of Natural History in New York.

Dr. Weidenreich had a magnificent story to tell. He had climbed an evolutionary beanstalk and found a giant man, perhaps twice as big as a male gorilla. There were Supermen among our ancestors!

We know there were giant forms among the lower animals, for the fossil records are far more complete than for man. Way back in the tiger’s ancestry lurked the terrible sabre-tooth. The huge and hairy mammoths and mastadons lived hundreds of thousands of years before the Ringlings’ famous Jumbo. But it is hard to imagine a man so big as *Gigantopithecus*—a man nearly twice as big as a gorilla; an animal that can reach six feet in height and weigh three times as much as a wrestler.

What would happen to our museum visitor if he ran across his Superman ancestor in a dark forest “alley”? Science can add this much to what you can imagine: Professor Earnest Hooton of Harvard’s anthropology department says the best human wrestler would be lucky to escape alive from battle with a half-grown, female gorilla. He might escape, of course, only if she did not get her teeth into his throat.

But there were other big fellows among our ancestors. During another expedition, this time in Java, the enterprising Dr. Von Koenigswald found a huge



skull and a lower jaw. The jaw was even larger, proportionally, than the skull. These two finds belonged to two out-sized ancestors. Neither was as big as the giant man of Hong Kong, but both would make modern man seem puny. Dr. Weidenreich believed these three ancestors are all linked in the evolutionary chain that finally leads to *Homo sapiens*.

Dr. Weidenreich suggested they are examples of different populations living in the same age, but not at the same time. These three forms, the Chinese giant; the man of the big jaw, called *Meganthropus*; the man of the big skull, *Pithecanthropus robustus*, show great differences, but as a group they belong together.

These discoveries and these decisions are fairly recent—within the last decade—but they lead to still another member of the group. His remains were discovered just ten years before the turn of the century by another Dutchman, Eugene Dubois. His discovery was made on the banks of the Solo River in Java, near a village called Trinil. He found the top part of an ancient skull, with the bony ridges above the eyes well preserved. Later he found a thigh bone nearby, and, on the basis of these two finds, called his man *Pithecanthropus erectus*—“ape man who walks erect.”

Dubois’ finds set the Victorian world afire. It was believed *Pithecanthropus erectus* was the long-looked-for missing link; more ape than man. He looked like an ape, but he stood erect! Dubois decided he belonged with man, and other scientists came to agree. Then Dubois changed his mind, many years later. But Von Koenigswald, his countryman, found more skulls in the same area; more complete skulls. He proved *Pithecanthropus* was nearer man than ape. He was, in a sense, a missing link, but not



This is a cast of the Weidenreich restoration of the powerful prehistoric man known as *Pithecanthropus robustus*.

remains completely confirmed the picture of Pekin man that Dr. Black envisioned on the sole evidence of the single tooth! Tragically, Dr. Black worked so hard to prove his case he died, prematurely, of tuberculosis.

The total finds in these caves give us a rather clear picture of Pekin man. Experts have decided he was definitely human, but he looked very different from us. His skull bones were thick and his forehead low. His brain, judging from the size of the skull, was bigger than an ape's but smaller than that of the average modern man. However, we cannot judge intelligence by mere brain size. Above, Pekin man's eyes were heavy brow ridges, giving him resemblance to the apes. But he walked upright. His jaw was more heavily protected by bone than ours.

He had a short, powerfully muscled neck. Since time destroys all flesh, we can never know for sure about the coloring of fossil men, but some authorities believe early man had dark skin, and eyes and hair. It is possible that Pekin man was still covered with hair like the apes.

If you dressed this ancient man in a good suit of clothes, gave him a haircut and a hat, he still would not look like us. Anyone running up against him in the subway might call the police. He would fare no better than a wild animal in New York—but how would we get along in Pekin man's environment?

Let us take a journey through time and space to ancient China, to the southwestern hills of Pekin. Today's nude hills were then covered with forest. The farms were yet undreamed of.

There was rain. Lots of it. Scientists believe this because so many of the bony remains in the Choukoutien caves belonged to deer. Deer are forest animals, and forests need rain. Geologists have found that the lake levels then were higher than now, and this is another bit of evidence that the climate was wet. Ancient Pekin's weather was perhaps not so cold in winter or so hot in summer as today, but certainly it was not tropical, as in Java.

These forested hills were full of animals. Some of them were strange—the sabre-tooth and mammoth—but many we would recognize. There were hippos, camels, buffalo, a huge hyena, and cave bears.

And there was Man. Again, like our small boy, he was alone in the hostile forest. There were no specialists to find his food, cook it, serve it to him. There was no medicine for his sickness, no machines to destroy his enemies. What must be done to live, he himself had to do—or die. His shelter was an overhanging crag, or, in the (Continued on page 500)

between apes and men. He added the latest link to the chain of *Gigantopithecus*, *Meganthropus*, *Pithecanthropus robustus*.

Crude stone implements have since been found in the *Pithecanthropus erectus* neighborhood—hatchets and flakes used for scraping and cutting. This man probably lived on the volcanic slopes and plains of ancient Java, then part of the Asiatic mainland, 300,000 years ago. The climate was tropical, and he must have eaten fruit, herbs and roots. He was a hunter, too, for there were many animals—deer, tigers, rhinos, and tapirs. Since Java was a kind of evolutionary catch-basin, *Pithecanthropus* may have been a late survival of an archaic form of man.

But let us go along a bit further on the same evolutionary line in Asia to another, younger set of ancestors. These were the ancient Pekin men, and we know much more about them because there are many skulls, teeth, and parts of the skeleton. Pekin man was not a giant. In fact, he was no bigger than ourselves; a bit smaller if anything. He lived in the southwestern hills of what is now Pekin about the same time, or a little later, than *Pithecanthropus*.

Again our story begins with a single tooth. It was discovered October 16, 1926, in the Choukoutien caves near Pekin, and recognized as a left, lower permanent molar by the anthropologist, Dr. Davidson Black. He decided it was human, and, with magnificent scientific courage, described a new kind of early man. He called him *Sinanthropus pekinensis*, or "The Chinese Man of Pekin." An expedition was organized, and soon excavations in the Choukoutien caves turned up several skulls and parts of skeletons, all human, as well as animal remains and stone implements.

And here is an amazing fact. The skulls and skeletal

Tinajas— Canteens of the Desert

By JOHN L.
BLACKFORD

Photograph by the Author



WATER! In the desert it dominates every other thought when you are without it. Yet men have perished there unaware of its nearness, often where wild things, similarly dependent, live out their entire existence.

Tinajas, or “tanks”, are one of Nature’s provisions in water-destitute lands for the thirst of her wild children. And in our Southwest the old burro prospector and desert-wise traveler are equally grateful for these “canteens” of the wasteland. Potholes and natural basins frequently weather out of exposed rock formations of even uniform composition. Such tinajas may be discovered even atop the “roofs” of towering mesas. In the beginning, shallow depressions retain the scant, winter rain water that promotes local decay. As chemical weathering of the pitted sandstone or granite proceeds, deep tanks in the rock result. A single hidden reservoir, unsuspected on

barren outcroppings of stone, may store hundreds of gallons; enough to quench the thirst of neighboring furred and feathered residents well into the scorching days of desert midsummer, keeping them alive in a dry land.

Other tinajas, along the courses of intermittent mountain streams, are scoured from the bedrock by roaring flash-floods that briefly renew the life of “dry waterfalls” and cascades. Months after the last freshet has leaped from the now parched lip of a fall, the arid land’s sweetest water may be cupped from the rock “cistern” carved in the streambed below. Gravel and sand, washed into the basin at the foot of the fall, guard the underlying water from swift evaporation, yet do not withhold life-giving drink from the searching paw of coyote and hoof of bighorn or wild burro. These are the hidden “coyote-wells” about which only the hardy, sagacious desert folk know.



“I Want to Know”

By LINDA WHITAKER BROWNE

What would you know? Put by that dreary tome,
The hummingbird, three times within an hour,
Has sought the nectar of the trumpet flower—
Would you not know where 'tis she has her home?

That great-crest pleased us when she made her nest
Within the box we placed in yonder tree;
Let's guess how many fledglings, two or three,
She shelters neath the softness of her breast.

The peach with glowing colors fairly drips,
Think you the fruit has grown since yester-noon?
The plum brews sweets ambrosial; say how soon
'Tis worthy of the sweetness of your lips.

Here is an ant-hill, builded since the rains;
If you would know, let's sit upon the ground
And watch the toiling thousands raise their mound.
You say it is so little for their pains?

Such foolishness! Perhaps you'd better go
Back to your book; for now within the lush
Cool of his woodland covert sings a thrush—
And I, too, want to know—I want to know!



At the left, Audubon's caracara on the wing, flying over its nest tree. Above, the attractive, brown-marked, downy young. Below, a caracara on the ground, where it is quite at home since it does much of its food-hunting there.

Audubon's Caracara

BIRD of the open prairie, Audubon's caracara is a northern race of a South American species. It is rare in Arizona, more common in Texas and Florida, but, as a persecuted bird, is diminishing in numbers. Rather appropriately, it is often called "Mexican eagle" or "Mexican buzzard," and it bears some resemblance to the eagle in flight and the buzzard in its feeding habits.

The pictures on these pages were taken of the birds in Florida, all of them by Wray H. Nicholson, except that of the downy young by Hugh H. Schroder.

The Kissimmee Prairie, north of Lake Okeechobee, is the favored Florida area for this bird. Its nests are often concealed in the tops of cabbage palmettos, in which the bird builds bulky, rarely lined structures from slender twigs or small sticks. Two or three eggs are laid, and a pair of birds usually has only one brood a year, unless the clutch of eggs is destroyed. The downy young is a rather pretty little bird with a head of dark, rich brown, and brown spots on its shoulders.



Carri6n provides a substantial part of the diet of the caracara, and it is therefore valuable as a scavenger. However, it also feeds on many harm-

Audubon's caracara bursts from its nest tree, powerful wings sweeping it on its way. It is an attractive and graceful bird in flight, going through many "stunts" in the air, in between periods of soaring. Below is an excellent picture of a perching caracara, showing the distinctive markings of the bird. The picture also indicates why it appears to the ignorant as a predator, which resemblance is the cause of its persecution.

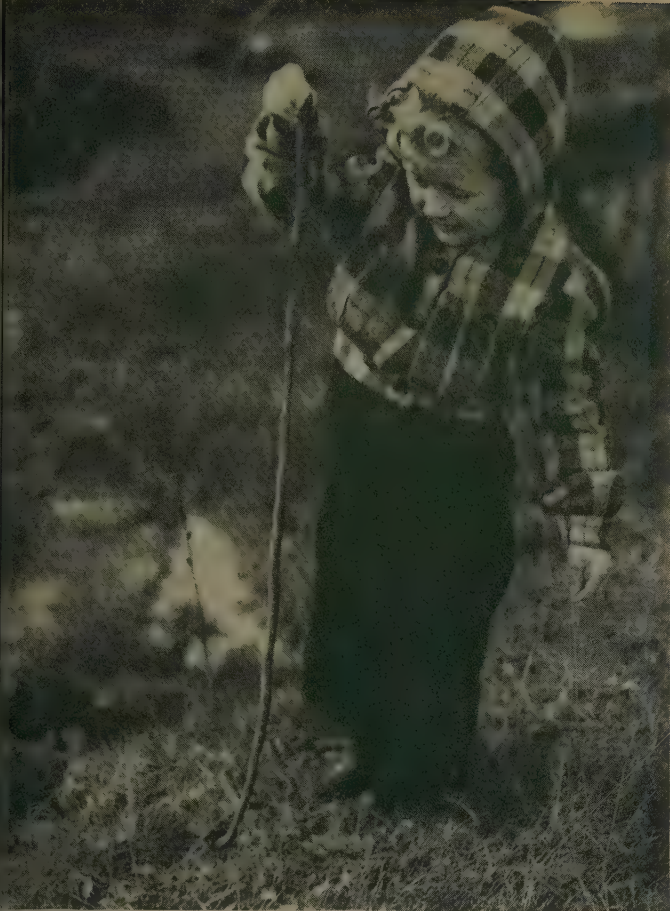


ful rodents and insects, frogs, crabs, crayfishes, fishes, young alligators, turtles, lizards and such.

On the wing, says Arthur Cleveland Bent, the "flight of the caracara is somewhat like that of the marsh hawk, with frequent turnings, risings, and fallings, but swifter and more graceful, with rapid wing strokes followed by long periods of sailing."

This bird of the Florida prairies is also much at home on the ground, where it hunts much of its food, walking easily and running quite fast. Bent says that the birds are often seen on the bank of a roadside ditch, waiting for a fisherman to throw away a fish, or some animal to be killed by a passing automobile. He also reports the caracara as aggressive in pursuit of its food, sometimes tackling even larger birds.

Aside from its warning cry to its mate, which is a high-pitched shriek, this fine bird is a rather silent fellow. However, often in the morning, or in the evening, it will given vent to a high, cackling cry, which accounts for the Brazilian name of caracara. It is a bird that merits protection as an interesting, attractive and useful member of the bird community. Unfortunately man kills it, as he does all birds that act like predators.



Australia seems to be able to present the world with many oddities of Nature, one of these the giant earthworm known to science as "*Megascolides australis*." The worm, which is recorded to reach lengths of from six to twelve feet, lives only in one corner of Australia, the wet river slopes of southern Gippsland in the State of Victoria. Above, five-year-old Edwina Cook is quite unafraid of earthworms—or is she? Anyway, she holds up one of the baby "giants" for inspection. At the right, Clem Cook holds up one of the worms to nearly its full length. Most of them are between six and nine feet long, the twelve-footers being rare. Below is a typical scene in the rich dairying valley of the Bass River in southern Gippsland, home of the earthworms.

Earthworms by the Yard

By JOHN LOUGHLIN

AS strange as the duckbilled platypus, whose haunts it shares, the giant Australian earthworm looks like a long, animated sausage. Measured in feet instead of inches, *Megascolides australis*, the world's biggest earthworm, is being studied with renewed scientific interest.

Specimens, with their three-inch eggs, have been flown to England and the United States. They were collected by Charles Barrett, a leading Australian naturalist, for the Rothamstead Agricultural Station and the University of California. The worm dies in a few days if it is taken from its natural haunts, so the specimens were preserved in long glass tubes.

Three yards of earthworm is not a rare size in the Bass River Valley of southeastern Australia, practically the only spot where the giant is to be found.

The worm stretches to maximum lengths when it is sliding through the grass, or when it is held high with its head reaching for the earth. Burrowing normally through the earth, it may be little more than a yard long and up to an



The giant earthworm shown, for contrast with two ordinary earthworms. Immediately below, a knot is tied in the worm to hold it until the rest of it is dug up. The worm will break easily if attempt is made to pull it from its burrow. At the bottom of the page, a heap of the giants shown with two of the eggs, which are two to three inches long and like greenish-colored capsules when fresh.

inch thick.

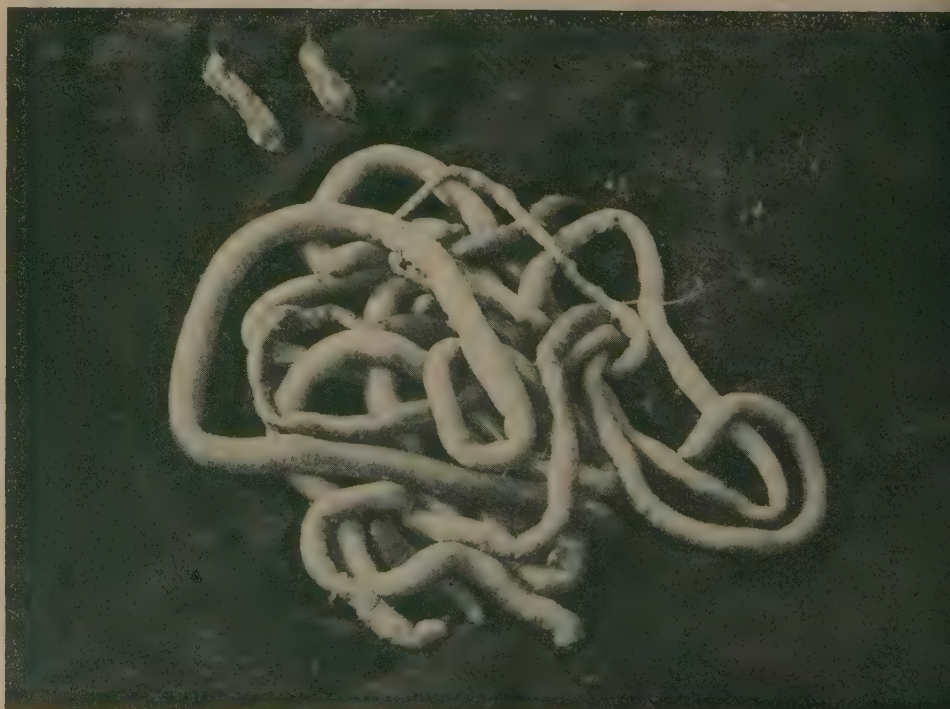
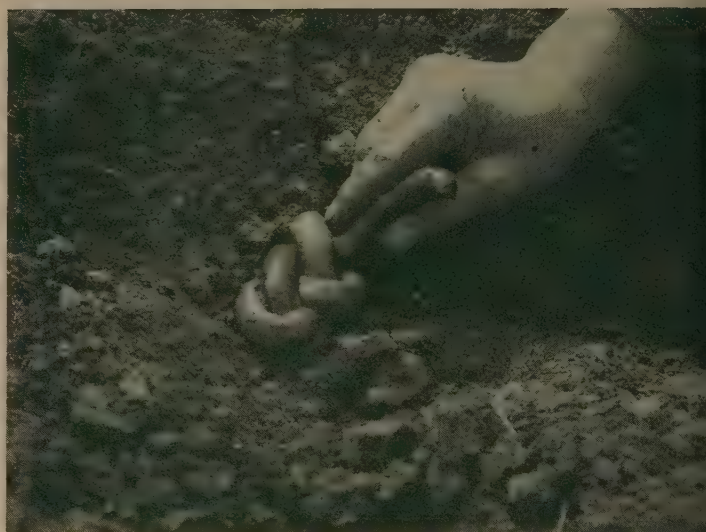
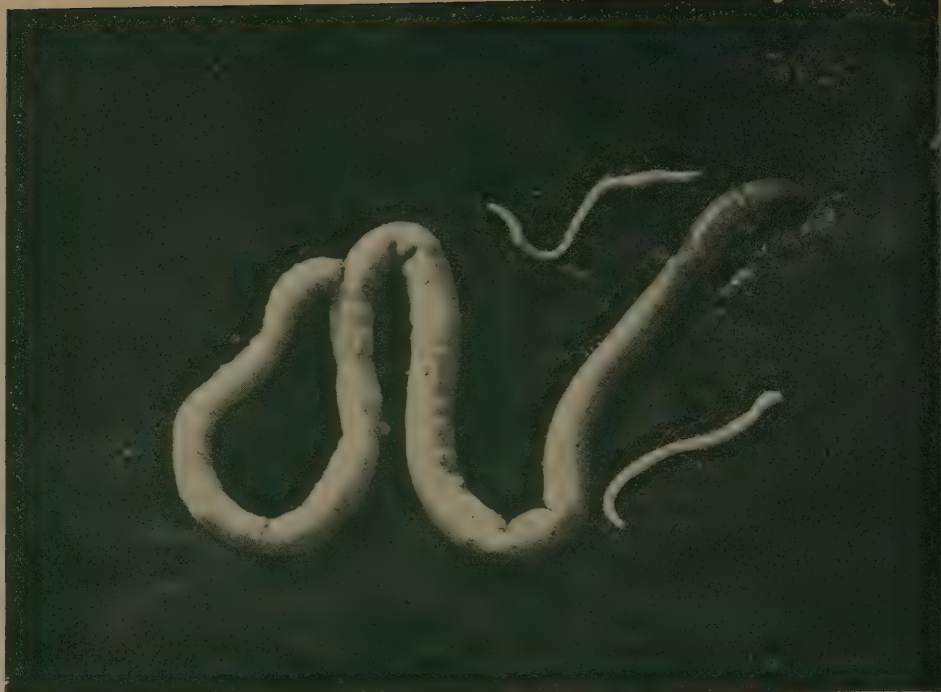
In the mountainous Gippsland country, the narrow, turbulent Bass River winds down to the sea among the dumpy hills, its course marked by wattles, eucalypts, blackwoods, and willows, with masses of ferns trailing in its icy waters. The lush slopes of the valley carry some of the richest dairy herds in the country.

In places the wet, clayey soil of the river flats is riddled by worm burrows. Even in the valley, however, it shows preference for particular spots, and large colonies gather in these localities. Finding the elusive earthworm is much easier than capturing it. The stock vaudeville joke about sitting down and listening to the earthworms playing does not sound so strange when you have heard the giant worms in their burrows. As you walk over the muddy flats, you may hear them retreating down their water-logged passages with a noise like the gurgling of the bathwater down the sink when the plug is pulled out.

Part of the technique of capturing a worm is to tie a knot so that your quarry can not vanish, in the twinkling of an eye, down its burrow. Then you dig the rest of it out at leisure, working carefully to follow the twisting course of the burrow and avoid chopping its tenant in half. You can not grab the first piece of worm you see and start tugging. The worm will distend its body inside the winding burrow and grip the sides so tightly that the piece will come away in your hand.

If you have the patience you can have an endurance test with the worm and ease it out, inch by inch, as it weakens its grip. You learn that from one of its few natural enemies — that smart snake-killer, the kookaburra. The "laughing jackass," as he is called, will seize his piece of worm and wait, blinking. Each time the victim eases his strain, "Jack" gives a tug and takes up the slack until the last inch of worm emerges.

A milky fluid with which the worms line the burrows makes them slippery and enables them to move rapidly by alternately contracting and expanding the rear and front portions of the body. Burrows sometimes go down to a depth of six feet, ending in a small chamber.



Arizona's Highway Opportunity

Review of a report on Arizona's roadsides based upon a study of conditions made by Mr. and Mrs. W. L. Lawton of the National Roadside Council under the auspices of the American Nature Association.



"ARIZONA has scenery to sell," says the National Roadside Council report on Arizona's roadsides. "Thousands of visitors come to the state to enjoy its grandeur and colorful beauty, as well as its climate. For most of them the highways are the windows of the state; only a small number venture off the main roads to explore on foot or on horseback.

"Happily, much of the finest scenery can be enjoyed

from the highways. The State Highway Department has done an outstanding work in providing excellent roads into all sections—a task fully appreciated only when you realize that the area of Arizona is greater than the combined area of New York, New Jersey, Pennsylvania and Maryland, while its population is less than that of the one city of Baltimore.

"The State of Arizona has made its scenery accessible,



Foster and Kleiser billboards "add" their touch of beauty to the Arizona desert scene.

Entering Arizona from California across the Colorado River. Yuma welcomes the visitor with this ghastly assault of assorted billboards. Five of them advertise "day and night" marriage service.

Entering Arizona on U. S. 66. A natural gateway of towering cliffs loses its dignity and beauty to a man-made gateway and by a welcoming billboard of the Arizona unit of the Highway 66 Association.





The east approach to Phoenix through Papagos Park affords lovely desert views, with distant mountains looming on the far horizon . . .



but even on this approach billboards have crept in, one inane welcome sign as inappropriate as a signboard in a fine residence yard.



The southern approach to Phoenix on South Central Avenue presents this display of unsightly and unplanned, sign-covered enterprises.



On the north approach to Phoenix are old olive and ash trees, fine residences and citrus groves. Only county zoning will protect it.

but what has been done to protect it? No scene remains lovely with a foreground of signs. Billboards and signs, held at a standstill during the war, are today breaking out rapidly in a new rash across the entire country. . . ."

Arizona, the study reveals, has caught the rash, its face is broken out with scenic sores in the form of large billboards, advertising national products, and a multiplicity of local signs, hawking everything from hot dogs to wild snakes. Arizona's only sign regulation today is the prohibi-

Cactus Park at Apache Junction, commemorating Snow Beard, the Dutchman, and his Lost Mine in Superstition Mountain.



tion of advertising signs on the right-of-way of the highway itself. The report suggests a basic law with an annual license fee, and annual permit fee for each sign erected; requirement of adequate setbacks from right-of-way, curves and intersections. "County zoning can go much further," it is pointed out, "restricting signs to business areas and keeping the rural highways open." Furthermore, this type of zoning would segregate roadside business within certain designated zones, and do away with the horrible ribbon slums that spring up along so many unregulated highways. Such zoning is protection for the rural property-owner, who now has no guarantee against destruction of his property values by hideous roadside development.

Tucson, the report emphasizes, is primarily a tourist resort, but it is beset by a mushroom growth of offensive establishments along its approaches, and an increasing invasion of billboards. The citizens were shocked when HOLIDAY called Tucson a "sign-cluttered city," but they could not deny it, as pictures in these pages indicate. And the Lawton report says: "Had intelligent city and county zoning been in control when the tourist trek started, the tragic results could have been largely prevented."

The survey reports on other Arizona communities, finding the situation generally bad, particularly on city approaches that could be kept attractive through county zoning. The data presented is accurate and factual, sup-

ported by actual pictures of conditions. The study is not intended to be critical of Arizona, but to show the state how others see her, and to suggest ways in which the existing situation may be met and progressive deterioration averted.

Stress is placed upon the traffic hazard presented by the highway billboards, and by turning an arterial highway into a business street. "Every intelligent and unbiased person," it is asserted, "knows that billboards along heavily traveled roads create a serious traffic hazard. . . . To read a message from a billboard the driver must take his eyes and his attention from the road. It may be for only one second, but a car at 60 miles an hour covers 88 feet in one second; at 40 miles per hour, 59 feet. Even 59 feet with the driver's attention away from the road too often means collision and even death."

On business development along arterial highways, the report has this to say:

"Arizona already offers examples of arterial rural highways degenerated into congested business streets, sure proof that the Blight is at work. . . . Such congested business development makes the highway functionally obsolete long before its physical facilities wear out. It soon becomes necessary to increase the capacity of the road, but the cost of widening is now prohibitive, and the taxpayer must pay for a new highway." Two new thorough-

Entering Tucson on the Speedway. Twenty-two disfiguring and distracting billboards in one mile.



The natural beauty of Tucson's environment is shown in this stretch beyond the roadside blight. It is on the north approach to the city.



A sunny road winds across one of Arizona's most lovely deserts.

ways are planned, but no provision, except the right-of-way, is made for protecting them from roadside deterioration.

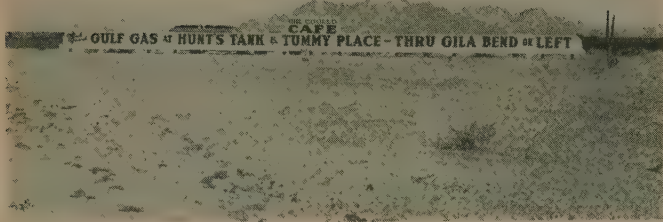
The Lawton report cites the experience of other states in meeting the roadside problem. In Virginia, for example, an enabling act has already resulted in zoning ordinances in 10 counties, 17 towns and 15 cities. A careful study by state agencies revealed that "some roads, because of the inadequacy of protective highways zoning legislation, are ugly and blighted where they might be scenic and

An artery becomes a business street. Ribbon slum on U. S. 80, just east of Tucson.



An equally beautiful road is that approaching Tucson from the south-east. But the highway environs have been taken over by the billboards.





One trading post at Gila Bend, left, spoils the natural beauty of the eastern approach to that town, and the cafe at Apache Junction is no asset.



County zoning will keep billboards in business areas and out of such locations as these. The majestic view of San Francisco Peaks in the picture at the left belongs to the people; no person or business has a right to appropriate it for private profit.

beautiful. All roads are more costly than need be because of the absence of this protective legislation." Virginia also found startling facts about safety, and that 19 percent of the highway accidents in rural areas occurred at highway or driveway intersections, many of them due to "indiscriminate access to highways by patrons of roadside commercial establishments." These, the state authorities asserted, "can be materially lessened by protective highway zoning ordinances."

California's experience with county zoning is also cited in the report on Arizona's problem. San Mateo County, for example, has protected 1000 miles of highway by zoning.

"The roadsides along main traveled ways became a nightmare of chaos and confusion," says the American Automobile Association. "The highways had made the American scene available to all the people, but as travel grew the American scene disappeared behind a barricade of unsightly encroachment."

This, says the Lawton report, is the Blight that is now threatening Arizona; that has already set its mark upon the state that is, as Raymond Carlson said: "This smiling land of time enough and room enough."

The careful study of Arizona roadside conditions reveals that there is still room enough in Arizona, but not room enough for the billboards and roadside slums that are fastening their grip on the environs of the costly highway. The survey reveals that the time is getting short if the state of Arizona is to meet the threat.

Copies of the complete report, of which this is only a brief summary, are available from the National Roadside Council, 119 East 19th Street, New York 3, N. Y.

Between Glendale and Phoenix there are nine miles of ribbon business like this on U. S. 80.



The World View

HITHERTO, UNESCO has paid little attention to Nature Protection in its consideration of the world picture. There now seems hope that this view will be changed, for a Panel on Nature Protection was asked to present its case to the U. S. National Commission for UNESCO, which included this vital issue in its program. This is encouraging, and we believe that we could do no better, editorially, this month, than to present the basic statement through which that message was carried to the Commission. The statement, presented by the panel of conservationists, is as follows:

Exploitation of the renewable natural resources of the world has been of variable intensity geographically, and appallingly destructive in the aggregate. These resources of water, soil, forest, wildlife and natural wild areas are basically vital economically, and of comparable importance socially and culturally. Protection and restoration of these resources, where possible, are inextricably a part of any world concept. Complete international understanding of the fundamental significance of all these phases of nature protection, and wise and informed administration of them, are essential to the future peace, progress and prosperity of the world. Nature protection, in its proper sense, comprises such a viewpoint—one that is integrally as encompassing as the concept of the United Nations itself.

Soil: Past and present history contains frightening evidence of the tragic results of wanton rape of the soil, Nature's basic gift to man. Human exploitation and abuse of the land are the underlying causes of the collapse of nearly every civilization that man has established. Soil exhaustion threatens our own society and culture. Wise land policies know no national boundaries, and programs of soil protection and regeneration that will cooperate with Nature in restoring soil fertility are a world-wide necessity. Dust bowls, whether in Oklahoma, China, Palestine or India, are Nature's retribution for man's violation of her laws.

Water: Hand in hand with soil, of vital importance to man is water. Pure streams, protected watersheds, high water tables, are essential to human life. Yet rivers and streams are brown with soil carried from the surface of the land. Carrying the filth of human sewage and industrial waste, these flowing waters are a menace to health, and are denied the opportunity to serve the biological functions Nature intended for them. The balances of aquatic life are threatened or destroyed, and man, through ignorance or indifference, is denying himself the complete use and enjoyment of his water resources.

Forests: No renewable natural resource has been—

and is being—exploited with such far-reaching results as have the forests of the world. Their destruction has reduced nations economically, impaired their water resources, increased land erosion, destroyed wildlife habitat and restricted recreational opportunity. Foresters are meeting the world forestry challenge scientifically, but forest protection and restoration can be finally achieved only through education of the peoples of the world to the importance of forests, as well as their correlative resources of soil and water. Forest use of the future must be governed by a philosophy of sustained supply.

Wildlife: Evolutionary processes of the past have brought about the natural extinction of many species, but man has proved himself the great destroyer. Some forms of both birds and mammals are being pushed to the brink of extinction, either through greedy exploitation for economic reasons, because of the destruction of habitat in which to exist, or from over-shooting for sport and trophy. A species once destroyed is gone forever—its economic value, its beauty, its inspiration, and its place in nature's delicate scheme are utterly destroyed. Many species of wildlife are international in their residence, and their preservation depends upon international agreement. Other forms are being destroyed for their commercial value, and are being extirpated therefor. Wildlife management in the United States has shown the way to maintain species and offers a world opportunity. Here, again, international agreement offers the only hope of protection. The world's wild animals are the responsibility of the world.

Parks and Wild Areas: The United States has taken the lead in setting aside in perpetuity areas that are outstanding for their beauty, inspiration and natural value. These areas are at once reservoirs for wildlife; protectors of soil and water; great outdoor museums of incalculable educational and cultural value. In many parts of the world there are areas comparable in significance to the national parks, national monuments and wilderness areas preserved in the United States. They can and should be preserved for posterity. International recognition of the wisdom of such policies of preservation and reservation must, however, precede action.

Nature Protection: Nature Protection is no narrow term. It relates to the entire world biotic community. There is no isolation in Nature, no national monopoly upon Nature's inspiration to mankind. In the words of Trevelyan, Nature "alone makes a common appeal to the sectaries of all our different schools of poetry and art, ancient and modern, and to many more besides these. It is the highest common denominator in the spiritual life of today."

Is the Bounty System a National Farce?

By DAVID HELLYER



The hand of man is against the coyote.



Foxes have prices on their heads in some states.



The wolf and cougar are the most persecuted among our native predatory mammals.



IS THE bounty system approaching the status of a national farce? Will bounties become a thing of the past in the near future? Evidence exists to support this possibility.

Although at least thirty-three states still provide legally for payment of bounties for the destruction of so-called predatory mammals and birds, the bounty system, as such, appears to be largely in disrepute among professional fish and game officials and wildlife technicians.

For many years, the U. S. Fish and Wildlife Service has frowned upon bounty payments. Representing a widely held view, Clifford C. Presnall of the Service states the case against bounties this way:

"The federal government does not offer bounties because it has been determined by long experience that bounties are not an economical and efficient way of spending money for the control of predatory animals. Such measures often result in a spectacular and sudden decrease in predator populations in areas where surpluses of the animals exist, but the bounty system has proved ineffective in making any appreciable reduction in the basic breeding population of coyotes. With animals that have a lower rate of reproduction, the bounty system may at times prove effective."

Officials of several states report sentiments paralleling those of Presnall, although some cite other reasons for disapproval of the bounty system.

Said Colorado: "Bounties tend to build up illicit interstate traffic. For example, we have a bounty on mountain lions, which we are endeavoring to do away with, and Utah has a bounty on coyotes. As a result, Colorado coyotes are taken to Utah to collect bounties, . . . and mountain lions are brought into Colorado in an effort to obtain bounties. Such conditions naturally increase our costs of administration and law enforcement. We of this department are thoroughly convinced that bounties paid by individual states are of no particular benefit."

Convinced that predator control by bounty is "barking up the wrong tree," Nebraska officials recently contacted game experts in eight neighboring states with a questionnaire on bounties. Results of this survey are challenging.

Of the eight contacted, five states answered "no" to the question: "Do you feel that bounties offer an effective control on predators?" These included Utah, Kansas, Colorado, North Dakota and Missouri. One (South Dakota) stated that bounties had a "questionable" effect on predators, while Utah contended that bounties "help." Wyoming ventured no opinion on this point.

"Bounties are not effective in controlling coyotes," Kansas admitted. "We have more than ever, despite the bounty."

Missouri reported that "the Commission does not contribute to the payment of bounties. We have been unable to find evidence that doing so is important to predator control. The coyote population has definitely increased during the years since bounty payment became popular."

North Dakota advised that strong sentiment for bounties exists among farmers and sportsmen, but that, in the opinion of the game department, bounties are "ineffective."

"Our conclusion," asserted Michigan, "after studying the bounty system in Michigan and its effects is that bounties cost a lot of money and produce no demonstrable effects on either the bountied predators or their natural prey." Michigan should speak from experience, for, since 1869, Michigan has spent over \$1,120,000 in bounty payments!

Mr. David Hellyer recently completed an exhaustive survey of bounty systems in the United States. During this research, Mr. Hellyer personally checked the fish and game codes of every state in the Union. Fortified with information gleaned from nearly 200 volumes of law books, he prepared personalized questionnaires, addressed in each case to the fish and game director of each of the 48 states. He reports the results of this extensive search below.

Nebraska, whose game department sponsored the eight-state survey, reports herself, also, on the "no" side on bounties.

"Bounties on coyotes, wolves, foxes, bobcats and other predators have actually had a thorough trial in many states, and under a variety of local conditions," an official reports. "A study of happenings of the past leads to one conclusion—that bounties cost a lot of money without producing any important control upon the bountied animals."

Shortage of natural food, rather than blood lust or wanton desire to kill, may be the answer to coyote predation, the Nebraska report stresses. "The coyote is a trader—you take the rabbit and he'll take the chicken."

"Memory tells us," the Nebraska report states, "that a good rabbit crop or two will be much more effective than bounties in lowering the damage to domestic animals by coyotes."

"Mass drives have done a great deal of harm to the rabbit population," the bulletin continues, "and the destruction of coyotes has probably been more than offset by the wholesale slaughter of rabbits, which are the coyote's usual food. Rabbit scarcity, from both hunts and natural causes, has undoubtedly done much to focus the coyote's attention on domestic poultry."

For 68 years, coyotes have been on Nebraska's bounty list, and the coyote population has "gone up and down anyway." During Michigan's 80 years of experience with bounties, "various predators have passed through the phases of their natural cycle, now up, now down, just about as they would have done had no bounties ever been paid." And it cost Michigan more than a million dollars to learn that lesson!

These observations would strengthen the naturalist's point of view on the "balance of Nature," which argues that Nature, left to her own devices, will strike the most wholesome balance in the bird and animal kingdom.

Still fresh in the memories of most naturalists concerned with preserving this vital balance is the tragic story of over-control in Kaibab National Forest, on the north rim of Grand Canyon. About 1907, U. S. Forest Service and Biological Survey officials determined to exterminate the mountain lions and other predators in the Kaibab, convinced that only by such drastic measures could they "save" the deer in the Kaibab. The slaughter began, and continued until 1919. By that time, one government hunter had, single-handedly, killed more than 600 lions in the area.

Then Forest Service officials surveyed the results. They were appallingly different from those anticipated. An official National Park Service report tells the pitiful story:

"The cougar, bobcat, wolf and eagle were all completely exterminated by 1919. The deer increased and reached such numbers that they ate more forage than the forest could produce. By 1924, more than 1700 deer were counted in one meadow. The deer kept increasing and the forest diminishing. Winter came, and deer died of weakness and starvation, and those that lived ate every leaf and twig they could reach, until the whole country looks as though swarms of locusts had swept through. It will probably take fifty years of careful game management to cover the scars. If there had been moderate hunting of both deer and predators, the situation in the Kaibab would not have occurred."

Which is substantiation of the naturalist's contention that man is not qualified to eliminate predators. In his predatory habits, man is not selective;



Great horned owls are on some proscribed lists.



The crow is the target of the most bounty laws.



Great blue herons are condemned, and the Cooper's hawk (below) proscribed.



in fact, he prefers the fit to the unfit, taking the best head of horns, the healthiest and largest game birds, the biggest and best in everything.

Birds and beasts of prey, on the other hand, thin out the weak and below-par. Diseased and unfit animals fall first. The hawk singles out the ailing quail; the cougar finishes off the unfit deer; the coyote makes short work of the sick cottontail. And even in their predation on herds of cattle and sheep the coyote and lion thin out the below-average animals first, thus doing the rancher a service. So go the naturalist's arguments, and they are supported by fact.

What of the much-touted destruction of game birds about which bounty supporters complain so loudly? Here again Nebraska experts come forward with an opinion.

"Most of the investigations concerning predator control have been conducted by agencies interested mainly in game birds and other animals. This has been done because of the common belief that predators hold down the game supply. These investigations can be summarized by the following statement: **PREDATION IS A MINOR ITEM IN DETERMINING POPULATION TRENDS OF UPLAND GAME BIRDS SUCH AS PHEASANTS, QUAIL, GROUSE, ETC.** (Capital letters are theirs.)

"Quail and foxes both exist in high numbers in southern Iowa and in Missouri," the Nebraska report continues. "Foxes and coyotes are present in Nebraska's better quail territory. Coyotes are numerous in the world's best pheasant range in South Dakota, Nebraska and North Dakota. Both coyotes and sharp-tailed grouse are numerous in Nebraska National Forest."

Referring to the author's request for information regarding gray fox bounties said to be paid in one county of North Carolina, the Commissioner of that State's Department of Conservation replied:

"It is interesting to note in this connection that since the law was passed four years ago, authorizing the county commissioners to pay bounties, foxes have increased in that county just as rapidly as in other counties. . . ."

The Commonwealth of Virginia reports that "our Commission discourages the payment of any bounties." Arizona states that "basically there is no bounty system operating in this state from any source," despite the presence of bounty laws on Arizona's statute books.

Evidence is ample that the bounty, in most states, is more of a political football than a serious effort to

control destructive mammals and birds. Pressure is brought to bear on legislators to enact bounty laws; they do so in order to keep peace in the political family. In some instances, where an unusually serious predator problem has caused real alarm, legislatures have enacted bounty laws in an honest effort to solve the problem.

In a great many instances, such laws merely empower the county, village, or some other political subdivision to pay such bounties as they may "deem advisable." For the most part, counties do not "deem advisable" such payments, although there are exceptions, of course. During the period from 1944 to 1946, 93 counties in Nebraska alone paid out \$33,000 for 33,000 coyote scalps. Virginia is typical of the opposite viewpoint. Referring to the state law authorizing county boards of supervisors to pay bounties, the executive secretary of Virginia's Commission of Game and Inland Fisheries comments:

"Very few counties have availed themselves of this privilege."

Bounty laws, legalized by action of the state legislature, in such instances merely "pass the buck" to local officials. This is

true in many of the 33 (or more) states that have written bounty laws into their codes.

Which birds and mammals are the principal targets of the bounty advocates? The writer's nation-wide survey shows that the crow ranks as "Predator Number One," insofar as legislation is concerned, with the English sparrow trailing close second. But even these birds have their islands of safety, with five states protecting crows and eight offering haven to the sparrow. Eleven of the 48 provide safety for the great horned owl, the rest putting him on the "wanted" list. Runners-up for the title of "most unpopular bird" are the Cooper's and sharp-shinned hawks, the goshawk and the starling, although the gamut runs from blue heron to blackbird, and from eagle (excluding the bald) to buzzard.

Among the bountied mammals, the wildcat is most sought, even outranking the coyote in the total number of states outlawing him. The wolf and fox top the reward list in "dollar value," bounties as high as \$100 being offered for the former. Close to 80 different birds, mammals and reptiles were outlawed.

Could this nation-wide trend away from the bounty system presage a trend toward wider acceptance of the balance-of-Nature viewpoint? It seems unlikely that the near future will see it. Yet predator control, in years to come, might wisely be returned to Nature herself, who practises it with superior wisdom.

Of Birds

By MAY GIBSON SHERBAKOFF

I cannot think of anything
Cooler than dawn on a thrush's wing,
Redder than red of a cardinal's vest
In an emerald pine where he keeps his nest,
Softer than silvery throat of a dove
Telling his love.
I cannot think of anything
To touch the heart at wake of spring
Like the plaintive cry in the timid breast
Of a fledgling making his first flight test,
With the whole of the forest world to prove,
And spaces above.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Some Facts About the Moon

By ISABEL M. LEWIS

AMONG all the satellites of the solar system our moon is unique because of its great size relative to that of the earth around which it revolves. The two largest satellites of Jupiter have diameters only about one-twentieth that of Jupiter, but the diameter of the moon is about one-fourth that of the earth. Seen from Venus at the time that planet is nearest the earth, and between it and the sun, the earth-moon system forms a beautiful double star in which the earth appears two or three times more brilliant than Venus does to us, and the moon appears as bright as Jupiter. As the moon revolves around the earth the distance between the two bodies, seen from Venus, is continually changing and can never be greater than about one-half degree, or the apparent diameter of the moon viewed from the earth.

One of the most remarkable facts about the moon

is that only six-tenths of its surface, approximately, is seen from the earth. The remainder of the lunar surface has never been seen from our planet. This is due to the fact that the moon turns once on its axis in the same time that it completes one revolution around the earth. As a result, the same face is always turned toward the earth. There are, however, "librations," or apparent swayings of the moon, arising from various causes, as a result of which we see first around one edge and then around another edge; so at one time or another about six-tenths of the entire surface comes into view. How the other four-tenths of the surface appears we can only surmise but it is probably very similar in its general features to the side turned toward us.

For the small telescope the moon is the most interesting to observe of all the heavenly bodies. Even if one has only binoculars it is possible to distinguish

some of the most remarkable surface features of the moon.

The most characteristic features of the lunar surface are the craters, which vary in size from the tiny craterlets, which appear as mere pinpricks on the surface less than a mile in diameter, to the great walled-plains, a hundred miles or more across. The typical crater averages from ten to sixty miles in diameter, and usually has a central peak, or group of several peaks, rising from a floor depressed a mile or more below the surrounding terraced walls or ramparts. Small crater-pits often are found on these encircling walls, and, in some instances, light-colored rays extend in all directions from them. Two of the most interesting ray-systems are those associated with two of the most conspicuous and beautiful craters, Tycho and Copernicus. The rays connected with Copernicus are feathery and intricate in pattern, while those that emanate from Tycho, and appear to originate in the small craterlets on the rim, extend in long, straight lines like meridians from a pole to distances of hundreds of miles. The most remarkable of these extends centrally across the surface of the moon nearly to the northwest limb. The origin of these enigmatical markings has never as yet been satisfactorily explained. They appear to lie always at the same level as the surface over which they pass.

The large, dark, smooth areas that are so conspicuously visible on the face of the moon, misnamed seas, or maria, since no water exists on the moon, are found most extensively in the northern hemisphere of the moon, although the Mare Nubium, Sea of Clouds, fills a large part of the southeastern portion of the surface. The roughest and most spectacular-appearing portion of the lunar surface lies in the high southern plateau region, where craters are piled upon craters, and there are huge walled-plains in the wildest confusion. Almost every type of lunar marking is to be found in this region—deep, narrow lunar valleys, or rills as they are called; cracks or clefts in the surface appearing only as thin lines even in large telescopes, and countless lofty mountain peaks. The Leibnitz Mountains, on the southwestern limb, and the Doerfel Mountains, on the southeastern limb, are the loftiest of the lunar mountain ranges, with some peaks exceeding 27,000 feet in height. As they appear on the southern limb of the

moon they cause the extreme roughness of the edge and produce the remarkable "Baily's Beads" caused by light shining through the lunar valleys on the edge of the moon at time of a total eclipse of the sun.

Baily's Beads will occur, of course, at any point on the rough edge of the moon where lofty mountain peaks and deep valleys appear in contour. They are particularly remarkable when seen along this roughest portion of the lunar surface. The most remarkable mountain ranges on the moon, the most massive and longest, lie in the northern hemisphere, where the lunar Alps, Caucasus, and The Apennines are located.

The latter is considered to be the most magnificent range of mountains on the lunar surface. It extends a distance of five hundred miles or more in one continuous curve along the edge of the Mare Imbrium, and has more than 3000 peaks, many rising to heights of three miles or more. The range ends in a conspicuous ring-plain, called Eratosthenes, about 40 miles in diameter. It has a two-peaked, central mountain rising from a floor depressed 8000 feet below the level of the Mare Imbrium. The northern extremity of the lunar Apennines terminates in a lofty mountain peak, Mount Hadley, which rises to a height of more than 15,000 feet. Although the mountains of the moon have been named chiefly for terrestrial mountains, and the seas bear such fanciful names as Sea of Serenity, Sea of Tranquility, Sea of Clouds, etc., the craters bear the names, with few exceptions, of great philosophers and noted astronomers.

A visitor to the moon could be provided with a map of a world as well charted as that from which he came, with the exception of the mysterious four-tenths of the surface awaiting his exploration.

No body in the solar system has given the astronomer more work and more problems to solve than our own satellite. Quite aside from the observation, naming and mapping of the principal features, which has been, with the determination of the size and elevation of mountains and their peaks as well as the measurements of craters in great numbers, a task of no mean size, there has been also the problem of the cause and origin of the different types of lunar features. Many scientific articles and books have been written upon the subject of the moon and the problems it presents. Of all the (Continued on page 497)

Drought

By RUTH MARGARET GIBBS

Pale fruit is withering on the bough,
The leaf is dwarfed, the branch half bare,
And all the forest children wear
A hungering sadness on them now.

Dreaming the lullabies of rain
They sigh to find the day begun—
Another day of burning sun,
Another interval of pain.

And like a hopeless, waiting brood,
Too young in growing to be wise,
They do not know maternal skies
Grow weary of their parenthood;

Nor guess that where the mad stars move
The one who lately gave them birth
Is gowning for her tryst with mirth,
Forgetting where she owes her love.

They have no voice to tell their fears;
They see her pass in faultless style
And droop beneath her painted smile.
When all they needed was her tears.



Teachers may call the Wisconsin Humane Society and order hamsters, guinea pigs, white mice, white rats, hooded rats, turtles, canaries, goldfish, or rabbits much as they take a library book.

Milwaukee's Pet Library

By DON DORNBROOK

THEY could not have been more than first-graders. Their little faces were full of compassion and anxiety. The boy was trying hard to keep a firm—yet gentle—hold on the baby robin feebly fluttering in his cupped hands. The girl's fat little fingers had an even firmer hold on a couple of pennies.

"Are you the bird doctor?" asked the boy.

"I guess you might call me that," said the veterinarian. "I've often been called a horse doctor. What can I do for you?"

"We're all right; it's this robin," replied the boy, holding out his hands. "We found him in Margie's back yard. He hurt his wing. He can't fly, and . . ."

"And if you can fix him we'll pay you," interrupted the girl. "I got two cents!"

Jimmy gave Margie that withering look men reserve for the female of the species. "Not yet, Margie,"

he admonished. "He ain't done nothin' yet!"

The veterinarian bent down and examined the robin. Its little heart pounded furiously against his palms. One wing was broken.

"Well. . . ?" Jimmy demanded.

"I can fix him all right," said the doctor. "Tell you what—you leave him here and when he's well enough to fly again I'll turn him loose."

"Will this be enough?" said the girl, thrusting her pennies in the veterinarian's face.

"Oh, we don't charge anything to fix robins," he explained.

"Gee, thanks," said the boy. His face broke into a smile as warm as the sun after an April shower. The little girl wore a look of wonderment.

"Jimmy," she asked as they clumped out the door, "why do bird doctors fix robins for nothing?"

"Aw, that's 'cause they eat worms," replied the male oracle.

After they had gone, the vet turned to me and said:

"Ever since the Humane Society started a pet library a couple of years ago, every vet in town has been pestered by kids bringing in injured birds and animals. A few years ago those kids would have pulled that robin's wing off. At least children are more humane than they used to be. That's why I always say I can fix their little patients—even if I know I'll have to put 'em to sleep, like that robin."

The Wisconsin Humane Society live-animal library in Milwaukee is the only one of its kind in the nation. When a teacher in any of Milwaukee County's 283 public, private or parochial grade schools wants her pupils to learn about animals at first hand, she just calls up the pet library and orders some hamsters, guinea pigs, white mice, white rats, hooded rats, turtles, canaries, goldfish, tropical fish or rabbits. It is as easy as drawing a reference book out of the public library.

The Humane Society provides the cage and enough dry feed to last two weeks. If there is no demand for that particular pet at the end of that time, the teacher may have it renewed. With her pet she receives a history of the animal, together with instructions for its care, the care of its cage and a feeding schedule.

PHOTOGRAPH BY HOWARD SOCHUREK



At first teachers were charged \$2 for rent of an animal for two weeks, but when it was discovered that most of them were making the payments out of their own pockets, the charge was discontinued. Now it is as free as the public library.

Animals usually are sent out in pairs "because, for some unknown reason, the kids like to have two of 'em at one time," says Gustave P. Utke, Wisconsin Humane Society executive vice-president. "But we don't pair off a male and a female unless we want a litter, or the teacher wants the children to observe the babies," he adds. "Even then we breed them at our shelter first and don't send them out to the schools until the babies are a week or two old." From 100 to 125 animals are available for withdrawal at all times, and teachers are free to make their own selections. Canaries cannot be taken out in winter—they catch pneumonia too easily—and the parrot never. He talks too much and sets a bad classroom example.

The pet library is the brain-child of Utke, who became executive vice-president of the society in January, 1945. Came spring and a teacher asked to borrow a rabbit for the Easter season. Utke obliged. Then he got to thinking that perhaps other teachers might like to borrow pets for study projects. Why not a pet library from which all teachers in the city could withdraw live animals when they needed them, just as they take out library books?

The program was begun on a trial basis in all city public schools in the fall of 1945. It proved such an immediate hit that it was expanded to all public, private and parochial schools of the county the following fall. Since then, Utke estimates, some 15,000 to 20,000 school children have learned how to handle animals in his pet project.

How well they have learned to handle them is reflected in the society's annual reports. In 1945 there were 200 complaints of cruelty to animals by children. The next year the total had dropped to 52. Last year it was a mere four.

"It's safe to conclude," adds Utke, "that children who are kind to animals will be more considerate towards their fellow men when they become adults. It has had a wholesome effect on their parents, too. Many more mothers and fathers have come to our shelter to adopt pets for their children since the pet library was started."

Children, of course, love the pet library.

Gustave P. Utke, executive vice-president of the Wisconsin Humane Association, whose program of humane education has brought surprising results in Milwaukee County. The pet library was his brain-child, and a happy one.

Three Milwaukee youngsters get acquainted with a visitor to the schoolroom. "It's safe to conclude," says Mr. Utke, "that children who are kind to animals will be more considerate towards their fellow men when they become adults."

There is so much competition among them for the privilege of caring for the classroom pets that teachers award this honor daily to the pupil with the best behavior the day before.

The animals make a vivid impression on the youngsters. One teacher, who had just returned a pet a few days before, was approached one day by a seven-year-old with a very dead kinglet.

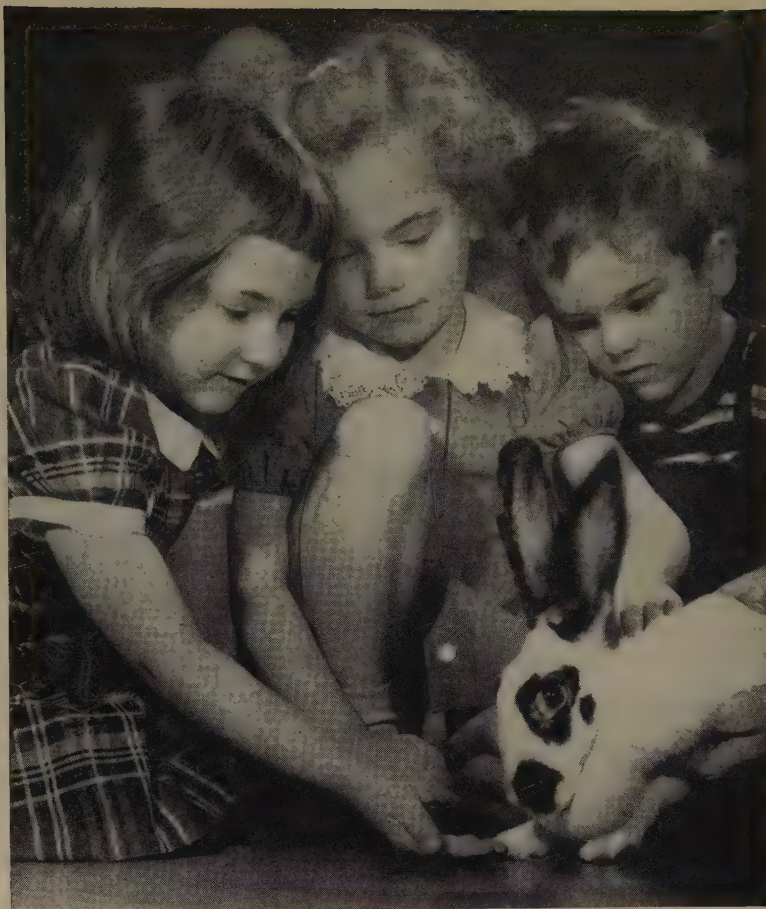
"I wonder if you could stuff him for me," she asked. "I think he's very dead in his neck."

The pet library, however, is not the only reason why the American Humane Association has called the Wisconsin Humane Society's educational program "the most complete in the country." Another reason is the year-around Dog Obedience courses Utke inaugurated in April, 1945, to train children how to handle dogs. Since then some 1000 Milwaukee youngsters and their pets have met on a higher intellectual plane. Ten-week courses for children from 10 to 16 years old are held in cooperation with the Milwaukee Dog Training Club. The club provides expert instruction in the proper way for a dog to sit, stand, lie down, come, heel and behave in company.

"A trained dog seldom is a stray dog," says Utke. "A trained dog is a happy dog. A child who learns responsibility toward his dog makes a more responsible citizen."

Wisconsin law provides that "every public school teacher shall devote not less than 30 minutes each month to teaching pupils kindness and the habits, usefulness and importance of animals and birds, and the best methods of protecting, preserving and caring for all bird life." The Wisconsin Humane Society makes this easy for Milwaukee County teachers.

Each month the society provides the schools with 74,000 copies of *Animal Life*, a little newspaper published by the Humane Society of Columbus, Ohio. Because Milwaukee is the largest group subscriber—it goes to every child in the first through sixth grades—there is a special Wisconsin edition. At least one column of this edition is devoted to local news. This may contain the latest animal antics of Oswald, the big black rabbit; Rocky and Rolly Raccoon; Mickey and Minnie, the waltzing mice, or Pete the Parrot—all denizens of the pet library. When Chico the trained dog appears on television, that is duly recorded in *Animal Life*. So is the fact that Peewee, the pet Shetland pony at the society's shelter, has



made lecture appearances for almost a year now. On each occasion a man has stood by like a sentinel (with broom and shovel) but never have his services been required.

Pupils take the newspaper home, and find it a big help in bringing up parents. Fathers and mothers, upon reading the "Did You Know?" column, are surprised to learn that a dog perspires on its tongue, nose and on the pads of its paws; that the porcupine has been known to remain in the same position for 48 hours, and that the octopus does not swim, but moves about on the bottom of the sea by using its arms.

This makes Utke very happy, indeed. He believes that his biggest job is to convince Milwaukee that the Wisconsin Humane Society is "not just another cat and dog organization." That is why the lecture hall at the society's shelter features adult programs three nights a week and always is available to interested groups who want to study Nature and animals. These programs—plus showings of sound films in the schools—reach more than 100,000 men, women and children in Milwaukee County every year.

"We don't want people to think of us as dog catchers," Utke explains. "Humane societies in the past have been too officious. They have said, in effect: You can't do this or we'll take you into court. Such a negative approach is wrong."

All the society's programs—in the schools, before civic groups and at the ani- (Continued on page 501)



INFRA-RED PHOTOGRAPH BY MAURICE BROWN

Observers wait atop Hawk Mountain, past which fly hawks and eagles in southward migration, safe now from a barrage of gun-fire since the mountain is a unique sanctuary.

Golden Eagles at Hawk Mountain

By MAURICE BROWN

"AN EAGLE!" exclaim several boys simultaneously, as a huge, dark bird brings up its sails along the crest of the ridge. More than a score of thrilled spectators are scattered on the rocky promontory, a thousand feet above the valley and overlooking four counties in eastern Pennsylvania. All field glasses are brought into action hastily, and for the nonce nothing else in the world matters but this big bird. Obliging it veers in the sunlight, revealing a crown and hind-neck suffused with rich, golden-brown. There is hushed silence. As the bird floats out of sight much animated chatter breaks out among the observers; someone announces that he may, at last, include the golden eagle in his life-list.

"I have traveled thousands of miles to see golden eagles, with never any luck until this day," said the professor from Lancaster, Pennsylvania, immense satisfaction oozing from his words. He need never have left his home state to see such avian wonders. Yet in recent times the golden eagle has been considered a *rara avis* anywhere in the East.

Earl L. Poole, in his brochure "The Birds of Berks County, Pennsylvania," published in 1930, recorded

the local status of the golden eagle as: "A very rare straggler in late fall." Hawk Mountain is in Berks County, and only four years after Mr. Poole's publication, in our first fall season at Hawk Mountain, when incomplete observations were made, we saw an embarrassing number of golden eagles—39 to be exact. The following season, when daily, systematic observations were begun, we saw 66! And, thereafter, the frequent appearance of golden eagles among the lesser raptorial birds proved to be the most exciting feature of each season.

Outside of Hawk Mountain circles there were many raised eyebrows as we reported golden eagles regularly. But seeing is believing, and rugged individuals who were willing to perch long hours atop the mountain, in the biting winds of November, had their doubts quickly dispelled. I shall never forget a bright, cold morning in mid-November, 1935. Five or six seasoned observers, among them Earl Poole, had been scanning the horizons with me. Into our midst came a tall, genial person who introduced himself as Mr. Spencer; he had come all the way from Erie to see our eagles. And he was frankly skeptical.

"Aren't you mistaken about your identifications of golden eagles? According to Chapman's Handbook they're not supposed to occur in the East," our friend suggested with unblushing boldness.

"Well," I ventured, "we do see golden eagles. But we always collect five dollars for each one we produce for doubting Thomases." The words were hardly out of my mouth when two adults appeared, suddenly, almost directly above us. The birds were so close, and their identity so obvious, that the gentleman from Erie was stunned, speechless. Then came a fine view of an immature bird, coasting leisurely down the ridge. When a few hundred feet from the Lookout, it plunged into the woods below us, with legs stretched forward. Finding nothing, it came up, circled several times below our vantage point, affording us one of the best opportunities for study. Mr. Spencer saw five golden eagles that memorable day.

A few days later—and those were the days when the Sanctuary coffers were all too lean—Mrs. C. N. Edge, indomitable originator of Hawk Mountain Sanctuary, wrote to me about a Mr. Spencer from Erie, who had written to her most enthusiastically and charmingly about his visit to Hawk Mountain, and with his letter was a contribution of \$25, in full payment of five bona fide golden eagles! Nor was that all. Our friend, the proprietor of a metal enamelling business, sent us a large shipment of attractive roadside signs, each bearing directional arrows and the spread silhouette of the golden eagle; enough signs to stretch all round the countryside and point the way for other eagle-seekers for years to come.

Of course, I do not wish to give the impression that the golden eagle is a common bird; it is obviously not. But when we began reporting these eagles seasonally, and sometimes in greater numbers than their cousins, the bald eagle, bird people, professional and otherwise, sat up and looked about.

At Hawk Mountain I have studied eagles in every plumage, sailing or sweeping past the Lookout at every conceivable angle. The great birds often favor us with exceptional opportunities for study. They frequently pass obligingly close to or over the Lookout, provided there is no movement on the part of the observers. Once, as I sat motionless and partially concealed by a great slab of rock, an adult golden eagle came within thirty feet of me. Time and again we have had the unique experience of looking directly down upon these birds, within gun-shot range. I often shudder when I contemplate the numbers of these noble birds, and lesser hawks, that were shot

down in the pre-sanctuary days, when the mountain was overrun with callous, irresponsible hunters.

It has been my good fortune during ten fall seasons to see the astonishing number of 1106 eagles . . . 52 percent were golden eagles.

Our identifications have been made easily in most instances. The "golden" color of the hind head is seen in immatures as well as adults. The latter show more or less gray on their otherwise dark backs, and grayish lesser wing-covers are usually distinct. Young birds are readily identified by the conspicuous white areas in their wings, and by their white tails with *broad, dark terminal bands*—both unfailing characteristics.

Eagles approaching in the distance can also be distinguished, for the noticeably small heads and not too conspicuous bills of the golden eagles mark those birds from the huskier-headed, large-billed bald eagles. I might add that it has always seemed to me that the tail of the golden eagle is perceptibly longer than, *not quite so square as*, that of the bald eagle.

After years of study of the flight of both species, I cannot say with certainty that I can readily distinguish them apart merely by wing beat, or speed, or the manner in which the

wings are held. Occasionally it has struck me that the golden flies more vigorously, not quite so labored as its relative. A fine opportunity for comparison occurred the forenoon of November 6, 1946, when a wholly dark adult golden and a wholly dark immature bald appeared together, at moderate elevation. I could see no difference in the length and width or cut of their wings; and in manner of flight they were as identical as Ike and Mike.

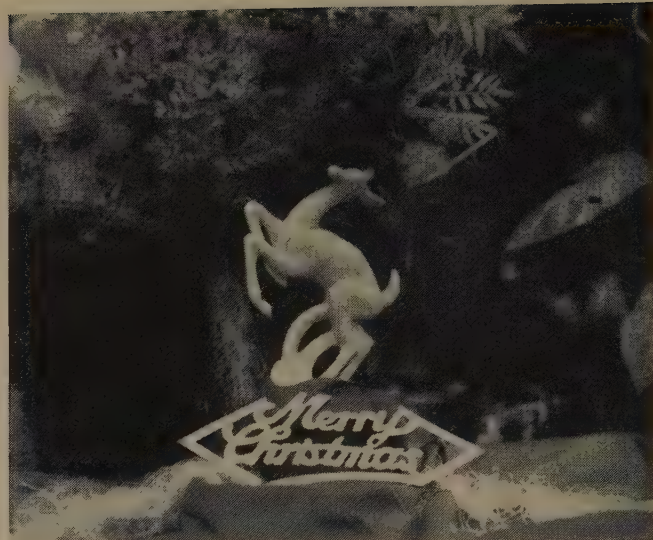
Adults and immatures alike appear at Hawk Mountain at regular intervals, usually from early October until early December, with the majority of each season's visitants showing up during the first half of November, when "the wind's like a whetted knife." One or two birds may be seen each September, rarely before September 24, although we have a record of one arrival on September 5, 1942, an extremely early bird, and another on September 15, 1935. On many occasions in early November visitors to the Lookout have been rewarded with the thrilling spectacle of as many as four to nine golden eagles in a few hours, and on at least four memorable dates we have seen as many as thirteen of these grand birds. The 1946 season produced a pluperfect score of 36 birds in one week—literally Golden Eagle Week! The fall of 1939, however, produced our best bumper crop—83 birds.

(Continued on page 500)

Autumn Sonnet

By RALPH H. COLLETT

Some olden brave has laid upon the land
His many-colored robe of autumn weave;
It blends the distant hills into one grand
Mosaic view of argyle hues that leave
Their myriad colors flaked like beaten gold,
And fusing all with amber field's array
Of frosted-crystal dew on harvest mold,
Reflects translucent hues where brooklets play.
And here where cobbled waters swirl and race
Their loot of forest-molt across the lea,
Sun-flashing colors sprightly interlace
Light-patterns etching pathways to the sea.
O, Brave of Indian Summer, tell where lies
Your many-colored robe when Autumn dies?



Two examples of tabletop Christmas greeting cards. The piratical motif was shot in the back yard. The other idea used a china ornament from the buffet and lettering from an old Christmas wreath. The other illustrations contain ideas for photographic greetings.

HAVE you done much Christmas shopping? For that matter, have you even figured out who is going to get what in the coming Yuletide season? No? Well, relax. There is still plenty of time—whatever is left of November and most of December. After all, unless you are one of those determined early birds, there is no terrific rush. You can shop up to the last store-open moment of December 24.

That relaxed, what's-the-hurry attitude is all very well for gift shopping. Christmas cards, however, are another matter. If you do not care about your own nerves, think of the poor postman and the annual "mail early" campaign designed to ease his aching back.

MAKE YOUR OWN

If you intend to make your own Christmas cards this year, with the aid of your trusty camera, time is running mighty short. You have a lot to do between now and the moment you drop the last card into the mail box. Better get busy right now.

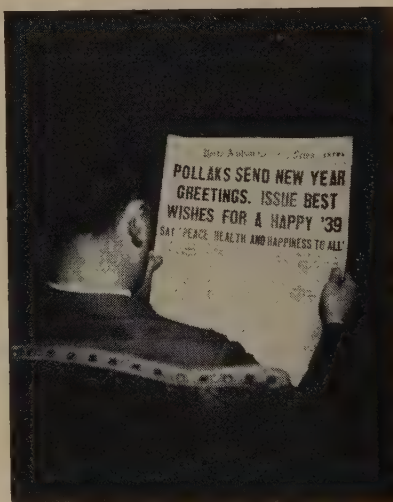
As a matter of fact, the makers of camera supplies have been at work for some months, getting ready for the likes of you. The Eastman Kodak Company, for example, started preparing for the photo greeting season back in July. Photofinishers, too, are stocked and ready with the needed equipment. But that does not mean you can wait until the last minute, and then expect service in time for St. Nick.

All right, shall we begin?

Christmas cards are naturals for the Nature photographer because scenery and animal shots lend themselves readily to holiday greetings. Snow scenes, pine trees, deer in woodsy settings, a cluster of poinsettias, a sprig of holly against the snow—any of a dozen shots already in the negative files will do in case you do not want to take a special

Camera Trails

By EDNA HOFFMAN EVANS



picture.

In the event that you do want something special, the baby makes a fine subject, so does a family group beside the fireplace, or the kids playing with the pup, or even yourself in some clever, characteristic or catchy pose. You can make a self portrait, or include yourself in the group by the old familiar string-on-trigger system if your camera does not have a delayed action timing device.

Illustrating this section is a series of Christmas cards, showing a variety of ways in which holiday greetings can be given photographically. Some required an elaborate set-up, while others are simple as can be. All are self-explanatory, and, by studying them, the reader can see how they were devised. From there he can go on to ideas and inventions of his own.

I have known people who planned cards a year ahead. They took a scene under the Christmas tree and held it in reserve, ready for distribution when the holiday season rolled around again. That technique, of course, assumes that no great changes will occur in the ensuing twelve months. Hubby cannot grow a mustache or shave off his old one during the interim. But it does save the concoction of a realistic Christmas setting ahead of time.

Whether you select an old negative, or set out with fresh film in your camera to make a special new one, the picture possibilities for Christmas cards are practically endless. You can make them indoors or outdoors, from settings that are life-sized or in miniature. Nor do you have to confine yourself to one subject. You can take a whole series of pictures—indeed, it is better to take more than one in case something goes wrong with your negative—and choose the best from the collection.

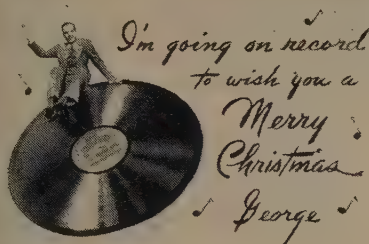
In case you do your own printing, you can use different pictures and have a variety

of cards. But, if you have the job done by a commercial finisher it is best to use the same negative for all your cards. That is, of course, unless you want to pay extra for each change in picture or greeting.

TABLETOPS

If, like myself, you have a penchant for tabletops, you have a fertile field ahead. I worked out a couple the other afternoon, using "props" that were handy. The pirates, of course, are rather far fetched, but the "Merry Christmas" in the treasure chest gives them timeliness. Normally, the whiskery chaps live in my dresser, while the ship model tops my bookcase. The scene was shot in the backyard with only natural lighting. In making the deer picture I used the same background, a china ornament off the buffet, and lettering from an old Christmas wreath. Manger scenes make good tabletops, and so do toys out of Junior's play-box. Look around; there are ideas everywhere.

But the picture is only one part of a photographic greeting card. And it is the



easiest part, at that. There is a lot of work to be done in the darkroom before you are ready to drop the finished product into the mail box. The simplest thing to do is take your negative to a commercial photofinisher and let him do the rest. He will have a number of greeting masks for you to choose from and—except for paying the bill—your worries are over.

In the event that you want to do all the work yourself, you can buy special greeting card production outfits—the one prepared by Eastman is available through any Kodak dealer. There are several kinds of paper to choose from, designed to fit the standard 4½x5½-inch greeting card envelopes. You can make your cards flat, single-sheet affairs, or you can fold them in a variety of ways.

There is less work involved when a single negative contains all the material, both picture and printed greeting. This greeting can be included in the original picture or can be lettered in later. For a white greeting on a darker negative, gummed cut-out stickers can be used. More elaborate and complicated effects can be obtained with multiple negatives.

FINAL DECORATIONS

After they have been printed, washed and dried, cards can be further dressed



up in a variety of ways. Instead of being left smooth-cut, edges can be "deckled," that is, roughed-up in an artistic manner. To gain this result, individual cards can be torn over the edge of a saw to get a jagged effect, or a whole pile of card can be sawed through. To gain a finer edge, you can rub the card with sandpaper.

Color helps, and colored edges can be added easily with quick drying red or green ink, dabbed on with felt nibs, or even with a small cotton swab like the doctor uses. Colored pen or brush lines on the face of the card help give a gray tone, and so do bits of ribbon or holiday stickers. Just do not get too generous with your "frills." After all, you are making a Christmas card for 1948—and not a mid-Victorian Valentine.

There is a great deal of room for personal taste and preference in the creating of a photographic Christmas card. Some people like to include the data—assuming that the card will be kept for years. Others let a simple "Holiday Greeting" do the whole chore. You can include your name in the picture, write it on the card, or have it printed by means of a mask. That, too, is up to you.

Just remember that a simple design is often more attractive, and is apt to hold the interest longer, than a set-up that is so crammed with detail that nothing stands out distinctly.

Last year I received photographic Christmas cards from a number of "Camera Trails" readers, and this year I hope to receive more. One of the most novel greetings, I recall, came from out West. It was in the form of a ribbon-tied booklet, and it showed the senders during various phases of a vacation motor trip—on a bucking (stuffed) broncho, beside cement "Forty-niners" in a ghost mining town, and so on. It was interesting to look at and must have been lots of fun to construct.

Another card, extremely elaborate,

called for a great deal of planning. The designers had regular folded cards printed, in the form of a house, with a partly cut-out door that opened. In the doorway was pasted a color transparency of the senders. Since each card required a new transparency, the entire result was effective—and expensive!

YULECARD SERVICE

For readers who have neither a darkroom nor a greeting-card-equipped photofinisher handy, here is an address that may help. The Mail-N-Save photo service, box 310, Quincy 69, Mass., has a special Yulecard service, whereby you furnish your own negative and can select any of three different card styles and six different greetings. Prices range from \$1.25 per 25 cards of one style (without your name) to \$2.75 per 25 cards of a more elaborate colored-edge style. For orders of \$4.00 or more, your name is added without cost.

The main catch in the above-mentioned Yulecard service is the time element. For best service, orders should be placed on or before November 15, while the company will take orders after December 1 only with the understanding that it does not accept responsibility for non-delivery before Christmas.

There is a lot of satisfaction in turning out a novel photographic Christmas card, regardless of whether you do all the work yourself, or merely take the original picture and let somebody else do the rest. Then, too, it is another way in which a camera hobby pays off. After all, how could a stamp collector or an antique-accumulator put his hobby to work at Christmas card time?

Maryland Salon

Under the sponsorship of the Natural History Society of Maryland, a nationwide Salon of Natural Science Photography will be held at the Baltimore Museum of Art during January, 1949. There will be four classifications of pictures—plant life, animal life, scenic and scientific. All entries must be postmarked not later than December 10, 1948. Information and entry blanks may be obtained from Earl H. Palmer, Natural History Society of Maryland, 2101-2103 Bolton Street, Baltimore 17, Maryland.

Modern Arboretum

"The Modern Arboretum, a Center of Regional, Botanical and Horticultural Synthesis" is the title of a little leaflet published by the Chronica Botanica Company, Waltham, Massachusetts, and available at twenty-five cents. It is the reprint of an address by Dr. Frans Verdoorn on the occasion of the first meeting of the Society of Southern California Botanists at the site of the projected Los Angeles County Arboretum.

The School Page

TREE LABS

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

MOST teachers are inclined to feel that the only kind of laboratory in which science can be learned in an indoor outfit* with a regulation number of tables, with running hot and cold water, alternating and direct current electricity, and a stuffy atmosphere, possibly poisoned by the fumes of preservatives in which crayfish, frogs, and fish have retained at least some semblance of their original form. These teachers are missing a wonderful opportunity if they overlook, as potential substitutes for the artificial set-up, a few trees that grow in their school grounds.

What do we see when we look at a tree? Some may see in it only a name; others, a picture; others, board feet; others, a place in which to climb; and others, a menace to the storm sewer. Still others can find in a tree a splendid means of teaching much that we consider as appropriate in geography; a rich source of experiences commonly allocated to physics; some excellent demonstrations in chemistry of a practical nature; splendid biology, and much else. And why do some see so little and others so much? In part this may be because those who see so much may have been forced to improvise in the past, while those who see so little have always had so much of their thinking done for them by others that resource and ingenuity have been dulled.

We need not here consider the possibilities trees offer us for the study of taxonomy. To most persons, the identification of a tree slams the door on it as a future source of interest. But how about the geography? Well, any tree makes its own little climate. So long as it grows in our northern country there will be a small area that will never be touched by the direct beams of the sun. In that little climate lichens may flourish better than in areas where a direct sun may inhibit their activity. We start looking at these lichens and we find ourselves off on an interesting by-way of study. We wonder how old a lichen an inch square is in the tree in front of our home. We look in the books for an answer and find no help. We ask a neighboring botanist, and he looks at us as though we should know better than to ask such a question, not admitting that he himself does not know the answer. We ask a professional educator and he tells us that, since it is not in the course of study, it is of no importance. But somehow we want to know the answer, and we are up against it for help from any source other than the lichen on the tree in our front yard.

Then we wonder how we are going to find the answer there. Common sense suggests that maybe it will show annual rings, like tree trunks, or fish scales, or clam shells, or the bones of some animals, but when we seek such evidence in the lichen we meet disappointment. Let me suggest that, if you are interested in such a question, you take a few copper tacks and drive them in a circle close to the edge of the lichen, and let some of the children of the lower grades know what you have done. Next year you may see what new territory may have been taken over by the lichen. You may care to mark that year's limit with a circle of iron tacks, and then alternate the years with copper and iron to get your answer. What you find

may give you and your students some appreciation of the rapidity with which some common, every-day organisms grow. Of course, you will want to select a number of lichens for this purpose so that you will not make the mistake of assuming that all grow with equal rapidity. This may help in developing a wholesome appreciation of the scientific method. Its possibilities will be evident.

The shadows on a tree may be used as a simple clock, for a while at least. Put a paper collar around your tree and mark where the shadow of the tree itself falls at hourly intervals today. Then, check to see how closely the two agree for the next week, month, and through the year. What you and your students find will give you some satisfaction, and raise some questions, all of which will be to the good. Once you have this clock idea worked out, it may be interesting to look at photographs taken of your tree at different times to see how nearly you can judge the time of the day by the shadows that show. And here we are starting you off to become Nature detectives. We wish you joy on your journey.

Some day it may rain, and your tree may offer you some beautiful lessons. If the tree is a pine, you will find the needles held together so that the tree looks bedraggled. Why do the needles cling to each other when they are wet and spread apart when they are dry? And, while you are thinking about that one, you may notice a clear, sparkling raindrop hanging at the end of a bunch of needles. In it if you look closely you

may see an inverted image of what is on the other side of the drop from you, and there you have a study of what lenses do to images, and how light changes its path in going through a transparent sphere. Then, while you are working on that, you may notice that the water drips from some branches, clings to others, drools down the sides of some, and soaks into others rather freely. Notice how differently water behaves on the bark of birch, oak, pine, and so on, and you have a whole list of other challenging

questions, the answering of which should give you some good practical physics and a lot of fun. Incidentally, it is of great importance to some trees that they can shed water and snow under some circumstances, and this may suggest some more observations and studies.

And now what about chemistry? There you can have a field day. You do not need to take it too seriously, either, to make some progress. But just look at a few brightly colored fall leaves and notice how they are not uniformly colored. Differences must have some significance, and their recognition should lead to some new understandings. Maybe you can find one leaf with what looks like the print of another on it. The overlying leaf may have shut off the sunlight from a small area, and the chemical activities that took place in the sun did not take place in the shade. With that as a starter, look elsewhere on the tree for similar evidence, and try to come to some conclusion as to why, in a maple, some parts may be yellow while others may be red, and decide that if you were to paint a maple in the fall both red and yellow where you would put each color. Then look at some artist's representation of a maple to see how really good an observer he may have been. And here we go seeing something, noticing a difference, seeking further evidence to support an interpretation and then applying what we have concluded to a new situation. Does anyone think we have wasted time? Have you ever been to an indoor laboratory exercise when you did less?

The chemistry lesson should be started early in the fall, earlier than is now possible this year. You should keep a record of the minimum and maximum temperatures through September and October, and of the hours of intense sunlight, to really help you understand what you see. If you want further help on this, drop a postcard to me at Ithaca, New York, and maybe

Contrast

By ALBERT WARNER DOWLING

Who seeks an early splendor for his praise
Will find ideal the jasmine's early blooms;
But others choose to mark how Time arrays
The slow crepe myrtle with reluctant plumes.

I can help you, although if you do I promise I shall ask you to do something for me in return. Just say on your card that you want help on this leaf color subject. I will find out in this way if any of you really want this page to do this sort of thing.

Of course, there is some chemistry on the ground under a tree. Go through your nearest woodland this fall and count the different kinds of leaves you can recognize on the ground over a square foot. Keep a record of this. Next spring, when the snow is gone, examine this same square foot to see if you can still recognize as many kinds as you could originally. Try it again in late summer before a new crop of leaves falls. What changes do you notice? How do you explain them? For example, do oak leaves last longer than maples, and maples longer than pines, or what is the order and why? Get yourselves in trouble in this, because, if you do and are a good teacher, you will learn by trying to get out of trouble, and I want to help you. This was the method of teaching Nature Study that used to be advocated by Wilbur Jackman of Chicago, a master teacher with a philosophy not shared by many of our modern leaders, unfortunately. Nowadays we want everything done for us, even our freedom to discover new things, our opportunity to make a living for ourselves, and the privilege of being masters of our own destinies. I say we want this with some reservations, because I know that there are many who feel otherwise. Those are possibly the people who will be using trees, or sidewalks, or window sills, or garbage cans for laboratories. They will not have to have everything done for them, so that all they have to do is press a button and read the grade of the pupil without any further effort.

Do not pass up the tree in your front yard as a potential laboratory. For a long time it has waited there. Do not waste any more time.

Accidental Landscapes

Climatic Accidents in Landscape Making. By C. A. Cotton. New York. 1948. John Wiley and Sons. Second Printing. 354 pages. Illustrated. \$7.00.

Author of books on geology and geomorphology, Professor Cotton, in the process of their writing, felt that to give adequate treatment to the climatic accidents that change, or have changed, the landscape this subject must be treated separately. He divides his subject in two main sections, one dealing with the climatic landscape types caused by dry and dry-seasonal influence, and the other concerned with glaciated landscapes. Geomorphological theories have not progressed to conclusions in many cases, but Professor Cotton's suggestions, carrying the weight of authority, are provocative.

New Posts

Robert H. Carleton, formerly assistant professor of physical science at Michigan State College, has taken over a new post as executive secretary of the National Science Teachers Association, with headquarters in Washington, D. C., in the building of the National Education Association. . . . Dr. Gustav A. Swanson has resigned as chief of the Branch of Wildlife Research of the U. S. Fish and Wildlife Service, to head the new Department of Conservation at the New York State College of Agriculture, Cornell University. . . . Dr. John Farnsworth Cornman, assistant professor of ornamental horticulture at Cornell, has been appointed the first director of the Cornell Plantations.

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THIS year, for the first time, the three major Science Teaching Societies affiliated with the American Association for the Advancement of Science will hold a series of joint meetings as a part of their three annual meetings. The three societies—The American Nature Study Society, The National Association of Biology Teachers and the National Science Teachers Association—will meet December 27-30 in Washington, with headquarters at the Washington and Willard Hotels.

The general theme for the sessions will be "Meeting the Needs of Society through Science Education." Three joint sessions will be held on the mornings of December 28, 29, and 30. Separate sessions of each Society will be held on the afternoons of those days. The special topics for the three joint sessions are: December 28, a panel discussion on "The Science Curriculum at All Levels of In-

THE AMERICAN NATURE STUDY SOCIETY AND THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS

ANNUAL MEETINGS

struction"; December 29, a panel discussion on "Problems of Science Teacher Training"; December 30, the "Third Annual Junior Scientists Assembly."

The afternoon session, December 30, of the National Science Teachers Association will be the Science Club and Science Fair Project Exhibit, with the theme "Teaching Devices and Pupil Projects."

Separate business sessions of the Officers and Boards of Directors of the sponsoring societies will be held on the evening of December 27. Separate business meetings of the membership of the

three societies will meet on the evening of December 28. Selected Kodachrome movies and slides will be shown at the evening meeting of the American Nature Study Society, December 28. A joint dinner of the three groups will be held the evening of December 29 at the Washington Hotel.

Hotel reservations should be made directly to the two headquarters hotels—the Washington and the Willard.

Questions concerning the programs can be directed to the Program Committee—Dr. Richard L. Weaver, P. O. Box 1078, Chapel Hill, North Carolina, for the American Nature Study Society; Miss Ruth Dodge, 490 Broadway, Dobbs Ferry, New York, for the National Association of Biology Teachers; and Dr. Morris Meister, 315 Riverside Drive, New York City, for the National Science Teachers Association.

PROGRAM FOR THE AMERICAN NATURE STUDY SOCIETY

The three afternoon sessions of the American Nature Study Society will be:

Dec. 28. "Nature in Everyday Living," with President Edwin Day Teale presiding. The four speakers will be:

Raymond Gregg—"Nature for the Layman," as illustrated in the National Capital Parks program.

Roger Tory Peterson—"Nature for the Professional," as illustrated by a lecturer, artist and writer.

E. L. Palmer—"Nature for the Educator," as illustrated in a college training and research program.

Lewis H. Babbitt—"Nature for Children," as illustrated by a collector and photographer.

Dec. 20. "Conservation Issues Today," a panel discussion with Conservation Chairman Richard Westwood presiding. The Panel members will be: Devereux Butcher, National Parks Association; Ira C. Gabrielson, Wildlife Management Institute; William Vogt, Pan American Union; Ruth Gilmore, Rhode Island Garden Club Federation; Howard Zahnizer, The Wilderness Society.

Dec. 30. "Nature Literature for Children," with Richard Weaver, Secretary of the American Nature Study Society, serving as Chairman. The speakers will include:

Dr. Glenn O. Blough—"Using Nature Literature in School Programs.

Edith Patch—"Writing Nature Literature for Children."

Elizabeth B. Hamilton—"Publishing Nature Books for Children."

Eva Gordon—"Reviewing and Selecting Nature Books for Children."

PROGRAM FOR THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS

The theme of the afternoon sessions of the National Association of Biology Teachers will be "The Role of Health in Biology." The three sessions will be:

Dec. 28. "What current health needs are being met through recent research?" The following papers will be presented:

Combatting the effect of the atomic bomb and atomic fission on living things.

The use of blood and its derivatives in restoring health and preventing disease.

The use of hormones in glandular unbalance.

Antibiotics in treatment of disease. Viruses and virus diseases.

Dec. 29. "What integration of health factors with biological principles can be made in a course of biology? The following topics will be presented in a panel discussion:

Biological principles basic to the understanding of health.

Minimum essentials of a good health teaching program in (a) high school (b) college.

Methods of teaching health.

Correlation of health teaching and physical education.

The role of the biology teacher in the health program.

Medical staff relationship to health teaching.

Criteria for judging the effectiveness of health teaching.

Dec. 30. "How can the teaching of biology and health become a factor in the improvement of human relations?" The following papers will be presented.

The part that biology can play in developing proper attitudes toward

human relationships.

Respective roles of teachers, psychologists and psychiatrists in maintaining mental health in schools.

Physical factors in social adjustment. Studies by Kinsey.

OTHER NOTES ABOUT THE ANNUAL MEETINGS

Since this page is shared jointly by the NABT and ANSS, the program of the National Science Teachers Association is not included here. . . . All of the programs, however, will be included in a joint program available at the meetings. . . . Professor Robert W. Lefler of Purdue is the secretary of the cooperative committee of the three groups, and all owe him a debt for the effective way he has knitted things together. . . . The local committee is led by Keith Johnson for the NSTA, W. Edgar Martin for NABT, and Richard W. Westwood for ANSS. . . . Non-members of any of the three groups who are interested in the field of work of the organizations are invited to attend all general sessions. . . . Public attendance is particularly invited to the panel discussion on conservation, which should produce much valuable discussion, even verbal fireworks, conservation being such a varied and sometimes explosive subject. . . . Special plans are being made for several helpful education exhibits of non-commercial character, which will be installed in the Hall of Nations room at the Washington Hotel on Wednesday and Thursday. The joint morning meetings of the three groups will be held in this excellent meeting room, as will the joint banquet on Wednesday evening. . . . Whatever influence the Washington committee has with the Weather Bureau will be exerted to see that Washington weather behaves and that no blizzards, such as featured the Boston and Chicago meetings, materialize.

SOME FACTS ABOUT THE MOON

(Continued from page 486)

pages of astronomical data and information published in *The American Ephemeris and Nautical Almanac*, more than four-tenths of the total number are devoted to data and information concerning the moon. The same is true, approximately, of national almanacs of other countries. The position of the moon is published for every hour. Pages are devoted to eclipses of the sun, caused by the moon, and eclipses of the moon in the earth shadow. These and many other pages, giving data on occultations of stars by the moon, are of great importance in many scientific investigations now being carried on. When a star disappears behind the moon, reappearing a number of minutes or an hour or more later, it is said to be occulted by the moon. Observations of a large number of these occultations are made by observers all over the world, so that the moon's position may be determined as accurately as possible. Eclipses of the sun are valuable for the same purpose, as well as for other scientific purposes of considerable value and importance.

One of the greatest of the mathematical problems that have engaged the attention of men skilled in celestial mechanics has been the problem of the moon's motion, which has not yet been completely solved. There are corrections of the moon's position to be made continually to bring agreement between theory and observation.

Other information furnished, concerning the moon, for those who need it has to do with the tides, which are caused by the action of both sun and moon, although this is not supplied by the Almanac Offices. They do, however, publish much necessary information for observations of the surface features of the moon. Data on time of moonrise and moonset and on the phases of the moon are also published and widely used. One might conclude, then, that our satellite is quite a troublesome as well as important little body. One should add that it also gives us more pleasure and satisfaction than any other body in the heavens, with the exception of the all-important sun. It would be a dreary world, indeed, without the friendly light of the moon, especially in winter in high latitudes, where the long nights are brightened by its presence for many long hours.

On November 1 there will be a total eclipse of the sun visible in its total phase within a narrow strip extending from central Africa across the Indian and Antarctic Oceans, and in its partial phases over all of Africa, except the western part, and over most of Australia and New Zealand. The longest duration of the total eclipse will be less than two minutes.

The planet Mercury will be in fine position for observation in the eastern sky before sunrise until after the middle of the month. It will be farthest west of the sun on November 4. Venus is still a fine object in the morning sky before sunrise, although it is now drawing closer to the horizon. Mars is still in the evening sky, but is getting too low for good observation. Jupiter is also in the western sky in the evening in Sagittarius and sets a few hours after sunset. Saturn is in Leo and will be in quadrature, ninety degrees west of the sun, on November 28. It then rises about midnight and is on the meridian near sunrise.

The Leonid meteors should make their annual appearance on November 13-15 and be seen in largest numbers in the early morning hours on those dates.

Michigan Photo Salon

Under the sponsorship of the Cranbrook Institute of Science, the Third Michigan International Exhibition of Nature Photography will be hung at the Institute next spring. Entries will be received up to March 14, 1949, and full information and entry forms may be had from Roger E. Richard, 1832 North Gully Road, Dearborn, Michigan.

Foresters to Meet

The annual meeting of the Society of American Foresters will be held at the Statler Hotel, Boston, from December 16 to 18. One feature of the sessions will be observance of the fiftieth anniversary of professional forestry education in America, which began at Cornell University in 1898. There will be general meetings and special sessions devoted to the Society's nine specialized divisions.

For Photographers

We have received from Camera Press, Ltd., Russell Court, Coram Street, London, W.C. 1, England, a request to be placed in touch with Nature photographers in the United States who may wish to market some of the products of their work on the Continent, and in Great Britain, through that agency. A note to T. L. Blau at the address above will bring full details with respect to a working arrangement.

Park Income

It is not all outgo in the management of our National Park system, and revenues reached an all-time high in the 1948 fiscal year, totalling \$3,303,327. Automobile fees accounted for \$1,819,599 of this. These revenues amounted to approximately 53 percent of the cost of administration, protection and maintenance of the 180 areas administered by the National Park Service. However, these funds go into the U. S. Treasury and are not available for expenditure by the Service, which must depend upon the vagaries of appropriations.

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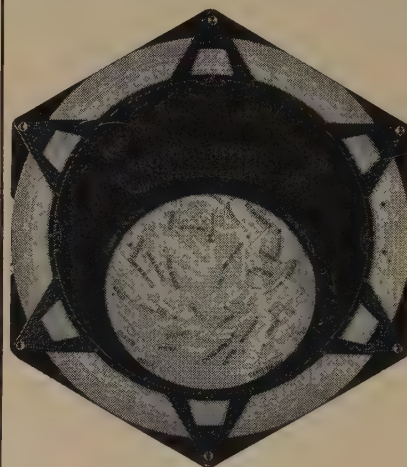
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GADDY'S GEESE

(Continued from page 460)

for "Mr. Blue Jim and Junior", and proudly point them out to newcomers.

As to the value of this Gaddy wild goose refuge, the Fish and Wildlife Service wrote Mrs. Ove Jensen, President of the North Carolina Bird Club: "We have been much interested in this flock of birds. . . . The success which the Gaddys have enjoyed in attracting and protecting these birds suggests the desirability of this work being taken over as a project by the North Carolina Bird Club. In many ways it is similar to the concentration and protection of birds as is achieved on the Miner Sanctuary at Kingsville, Ontario, and on Lake Merritt in Oakland, California. In both places public participation has been necessary and the response has been gratifying in view of the educational possibilities that result."

For three years the geese began leaving the Gaddy Refuge on March 20, usually departing in three different flights. This year, writes Mrs. Gaddy:

"The first large group, an estimated 2000, left around 7 a.m., March 16. On Thursday, March 18, we witnessed one of the most thrilling take-offs in all our experience. During the afternoon they seemed to be unusually hungry, and we kept feeding them. They chattered among themselves, seemingly making plans. Around 5 p.m. groups began circling over the pond, calling and calling, and at 5:30 large numbers began flying directly north. There was a continuous leave taking which lasted for an hour, some taking off from the water and some from the land. As far as you could see, the sky was dotted with them. At intervals maybe one lone goose would return—probably got away in the wrong family. There was one group of 50 that came back, talked some others into a notion to migrate, and off they went again. We estimated there must have been between 2000 and 3000 in this migration."

Departure of the birds is a lonely and strangely empty time for the Gaddys, and many of the neighbors are now beginning to miss the geese. But, along about October, how anxiously they begin watching for the return of the first winged wanderers from out of the North! How welcome is the sound of that first wild honking that has so stirred men's souls since primitive times!

Last year the Gaddys kept a record of the first returns. On October 12 three geese arrived; on October 13, four; October 14, twenty-eight; October 21, thirty-two, and the next few days they increased more rapidly. On October 25 "Mr. Blue Jim" and the youngster arrived; by October 26 there was an estimated three hundred geese; by five days later, about seven hundred; Nov. 2, a thousand; Nov. 16, fifteen hundred; Nov. 21, three thou-

sand; Dec. 1, four thousand. And, through December and early January, another thousand!

By that time everyone must feel as did the three-year-old boy who came with his Dad the day we were there. He looked the geese over gravely, squatted down on his heels and surveyed them carefully from that angle, walked solemnly hand in hand with me along the banks, accepted the proffered handful of corn from the warden and threw it to the geese, then finally announced, in high-pitched but assured tones, "They's just geeses everywhere. And I likes them!"

BETTER THAN A MOUSE TRAP

(Continued from page 465)

ture. The wary midget appeared again and again at the exit, but never came out of it. It darted back instantly after each terror-stricken split-second peek at the camera. Mr. Zavoda was using an f16 stop at one-one-hundredth second with No. 11 flash bulb and Tri-X film. Working fast and perspiring profusely—although it was zero weather—he felt confident that he would have some good pictures. When they were developed he had a fine collection of photographed knotholes—all empty but one. The least weasel was conspicuous by its absence 49 times out of 50. The result the fiftieth time appears at the head of this story. The unhappy wilding was released from the cage after his unwilling encounter with the camera.

HOW ANIMALS SLEEP

(Continued from page 468)

ing, that a humble-bee returned on successive nights to sleep in the identical hollyhock bloom.

The twilight has produced a curious habit among some species of moths. Their "day" is the twilight and dawn. They become active during twilight and conduct their crepuscular business until darkness descends. They then sleep again until dawn steals upon the world. During the time before sunrise these moths are once more on the wing, but when broad daylight appears they sleep again until twilight calls them forth once more.

Writing of the sleep of ants, Dr. Julian Huxley says: "They may choose a depression on the soil as bed, and there lay themselves down, with legs drawn close to the body. When waking (after some three hours' rest) they behave in a way startlingly like that of our proud human selves. The head and then the six legs are stretched to their fullest extent, and then often shaken; the jaws are strained open in a way remarkably reminiscent of a yawn."

The most wonderful sleeping habit of any creature of which I am aware is

that of the brown seal. R. M. Lockley says that when he was studying seals in an aquarium in Germany he noticed a pair of brown seals sink slowly to the bottom of their tank in six feet of water. The female closed her eyes first and was soon so fast asleep that a current of water made by her companion rolled her over on to her back without waking her.

Lockley continues: "Just as the bull began to doze off at the surface, and gradually to sink with his eyes shut, I saw the cow rise, lifting herself with a scarcely perceptible flicker of her 'tail' and fore-flippers. *But her eyes were fast shut* when she slowly breached the surface and began to blow audibly. After some sixteen deep 'breaths' she closed her nostrils and sank again to the floor. Her eyes had been closed throughout this breathing interval of about one minute, and there is not the smallest doubt in my mind but that she was fast asleep throughout. She sank down and remained for five and a quarter minutes before rising and breathing (twelve times) again, and still without opening her eyes."

Her companion then commenced the same process, sleeping on the bottom for several minutes, and then coming up for fresh air. The two seals continued their sleep, bobbing up and down every few minutes, for about half an hour, until a loud noise in the aquarium spoiled their watery slumbers.

Science Writing Awards

The George Westinghouse Science Writing Awards for 1948 were presented at a luncheon meeting held during the centennial meeting of the American Association for the Advancement of Science, to Frank Carey, science reporter for the Associated Press, and Dr. Florence Moog, assistant professor of zoology at Washington University, St. Louis. Mr. Carey's award came for his four-part series entitled "Newest Wonder Drug Conquers Dread Scrub Typhus". Dr. Moog received the award for an article "The Biology of Old Age", published in *Scientific American*. Each award was for \$1000.

British Forests

Forestry and Woodland Life. By H. L. Edlin. London and New York, 1948. B. T. Batsford. 184 pages. Illustrated. \$4.50.

This book is designed to acquaint the layman with the science and craft of tending woodlands as at present practised in Great Britain. As such it perhaps has only comparative significance for people in the United States, although many of our woodland areas, particularly in the East, can now benefit from lessons learned abroad. The book is profusely illustrated, and treats with the forest from many points of view.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

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likewise are counted as one word. Hyphenated words are counted as two words.

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7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are

not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

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OUR FORGOTTEN SUPERMEN

(Continued from page 471)

worst weather, a dark cave, filled, perhaps, with the horrible laughter of the big hyenas.

In his hand was a club, or a pointed, knife-like stone he had chipped. An animal skin was thrown over his thick, heavily muscled shoulders. His eyes were deep-sunk under the bony ridges. In them were both fear and a raw, red courage.

He lived in tight little groups—hunters, searchers for fruits and berries, food-gathering groups that must stick closely together. For Pekin man had more than the big mammoths and cave bears to fear. Some of the bones, human bones, in the Choukoutien caves tell a macabre story.

There were openings at the base of the skull, crushed by weapons. And some of the long bones were split lengthwise to expose the marrow. No animal could have done this.

Pekin man, however, had one great friend—fire. Charred remains in the cave proved this. In ancient times, fire was man's atom bomb. No animal has ever learned to use it. Not even the clever chimpanzees. With fire, man could frighten the predatory animals from the caves, and keep them out. He could keep warm during the long rains. Did he know how to cook? Possibly, but he was probably not much interested. More likely he wolfed his food where he found it. Eskimos, even today, do little cooking. To them, fire means heat. Cooking is a foible of civilization. To ancient man it would seem a waste of time—time that could be spent hunting.

In this kind of setting there are no weaklings, no live cripples or old persons. Modern man would be struck by the youth of Pekin men and women. In this country, life expectancy now is about 64. But 300,000 years ago a man was lucky to be alive at 30. Infant mortality must have been terrific. An infant or a child is easy to catch, easy to kill.

Here, then, was a rough, tough competitive life. Pekin men had to do everything for themselves. They had to produce every day, just to live. They had to make their own weapons; become expert in chipping stone, making fire, hunting the great game. And their killing had to be done at close quarters, largely with their own strength.

What would the little man you saw scurrying to his desk this morning do with himself in the ancient hills of Pekin? His miserable body could hardly survive a week. And would he find his vaunted brain as great as he imagined? Let us remember we have one awful thing in common with the men of Pekin. That is fear. Nothing our brains have created over the centuries has erased our birth-

right of fear. Like the ancient men, squatting beside their flickering fire by night, we live in fear of our brothers, just over the neighboring hills.

GOLDEN EAGLES AT HAWK MOUNTAIN

(Continued from page 491)

At this point the reader may wonder as to the origin of all these golden eagles. Do they drift eastwards from the far West? Perhaps, to a very small degree. My own opinion is that nearly all of the golden eagles that are observed in the East are a remnant of a strictly eastern North American population, and that the birds that frequent Hawk Mountain and adjacent ridges in migration derive from some unknown northern breeding area.

In their passage over Hawk Mountain the eagles are sometimes pestered by small fry among the hawks. It is amusing to observe the little sparrow hawk, for instance, make passes at the "lords of the air" with their seven-foot wing-span. I have seen peregrine falcons, and even goshawks, make thrusts at golden eagles, but always the big birds exhibited complete indifference, and a serenity altogether becoming their lordly stature. But there was bound to come an exception to the usual behavior. And it came one afternoon in November, as if to dispute my answer to a frequently asked question at the Sanctuary, "Do the hawks ever kill anything as they pass." My answer had always been an emphatic "no!" Then it happened, in a breath-taking, electrifying moment that makes the occasion as dramatic as anything I have witnessed at Hawk Mountain in my ten years of stewardship.

Imagine, if you can, lying on your back and gazing with me into the zenith through a pair of 7 x 50 glasses. We see in the field of the binocular a large, dark bird, and a small hawk, neither clearly identifiable. We wonder how many hawks have been missed, flying at that incredible height above the Lookout. We switch to the greater reach of an 18-power binocular, and find that the big bird is an adult golden eagle, its satellite still indeterminate. The smaller bird is making desultory passes at the eagle. Suddenly the eagle thrusts forward, executes an Immelmann turn as effortlessly as a fly landing on a ceiling, and grabs the smaller hawk, which puts up a feeble, momentary struggle. The eagle, with set wings, hurtles earthwards at terrific speed, and, still clutching its prey, disappears into the densely wooded flank of the ridge. The wings of the smaller hawk are fully outstretched during the meteoric descent, and we note the ruddy breast of the red-shouldered hawk. It is all over in a matter of seconds!

I was alone, tense and breathless, and, I must confess, somewhat spent from following closely this hair-raising episode. I felt for the doomed red-shoulder, but, at

the same time, I had nothing but admiration for the eagle and its aerial performance. The bird's hunger was far greater, apparently, than its capacity to tolerate any impudence or annoyance. I have seen upwards of 145,000 raptors in passage of the Sanctuary, but this has been the only instance of "big fish eat little fish."

I have spent a good deal of time watching eagles, and have never ceased to be filled with child-like wonder at the great birds. "The way of an eagle in the air" is a vision of inexpressible grace, arousing our deepest poetic instincts, and filling us with pure esthetic delight. Personally I do not look forward to the day when the secrets of those vast, unexplored wildernesses to the far north will be revealed, for accompanying their opening will be the inevitable, widespread, indiscriminate use of firearms. Consider the sickening fact of how all wild things have suffered and melted away along the 2000 miles of Alcan Highway. I am afraid the cards are stacked against them, but at Hawk Mountain we will carry on our missionary work, and hope to draw inspiration from the sight of eagles, especially the golden eagles—mystery birds of the East—for a long time to come.

Sargent's Silva

Silva of North America. By Charles Sprague Sargent. New York. 1947. Peter Smith. Seven volumes complete with illustrations in a reprint edition of 200 sets. \$200.

Sets of the famed original *Silva*, covering all of the trees that grow naturally in North America, exclusive of Mexico, originally were published for sale at \$350, and a set today brings at least \$500, if it can be obtained. The author, former Director of the Arnold Arboretum of Harvard University, was the recognized authority on North American *silva*, and this noted work ranks among the great scientific works. In order to make the set more widely available, the publisher has brought it out in seven books, with the fourteen volumes bound in the seven. Reproduction is by offset lithography on high quality paper with a library buckram binding. The limited edition of the reprint indicates that this, too, may well become an item for collectors.

Nurserymen for Roadsides

At its recent national convention the American Association of Nurserymen adopted a resolution pledging to the National Council of State Garden Clubs "our support to its program for the elimination of highway billboards and other roadside blights which destroy or impair the natural beauty of the landscape." Mrs. Vance Hood, who is chairman of the national Blue Star Highway project of the Council, describes this action of the nurserymen as "heartening."

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PET LIBRARY

(Continued from page 489)

mal shelter—stress the idea that while it is not possible for every child living in a large city to have a cat or a dog, there are many other possible pets. They emphasize their belief that a goldfish or a canary can be just as much of a pet as a cat or dog, and that every pet, every bird and every animal must be treated well.

It took two months for August Orthmann, then president of the Wisconsin Humane Society, to convince Gustave P. Utke that he should leave his job as secretary of a big transportation company, in 1945, to take over the Humane Society. Utke's lifelong hobby has been animals, and he has been associated with the society since 1939. But he refused to become its executive secretary until he was assured that he could establish a year-around educational program for the entire community. Oldtimers just nodded and smiled; it was a worthy ambition. It had been tried many times before—with-out success.

Utke's first move was characteristic—and prophetic. He tore down all the gruesome pictures in the lecture hall; pictures purporting to show what horrible things happen when people abuse animals. Utke maintains that this is no way to teach kindness to animals. Says he:

"Tell a child what **NOT** to do, and he'll do it, out of curiosity. But teach him what animals can do for him and what he can do for animals, and he'll do it."

Utke's interest in animals dates back to his boyhood in Fond du Lac, Wisconsin. His father was a blacksmith who had a reputation for being so careful in shoeing animals that his competitors brought him their own colts for the first shoeing.

"I'll never forget the time a farmer came to town with a beautiful team of black horses pulling a big load of hay," he recalls. "As they drew up in front of my father's shop the farmer dropped his pitchfork into one of the horses. Dad was furious. He dropped his work, ran outside, climbed up on the wagon and landed a hay-maker on the farmer's chin."

Gustave Utke has been preaching kindness to animals ever since. He is particularly proud that his educational program should be accepted by the schools of Milwaukee County, an educational system that jealously guards its prerogatives and critically inspects any supplementary educational program by an outside agency. The attitude of the schools toward Utke's program is eloquently expressed by Superintendent of Schools Lowell P. Goodrich. Writing in the foreword to the society's sixty-seventh anniversary yearbook, he said:

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Under the Microscope

By JULIAN D. CORRINGTON

THE FRUITS OF THE LAND

THE word for fruit in all languages has a number of meanings and a larger number of connotations. It calls to mind the fall of the year, completion of labors, success, rewards. To the plant as well, the fruit is a climax structure, chief aim of existence in the sense that racial survival depends on successful adaptations for the completion of individual life cycles.

The popular and scientific ideas of what constitutes a fruit often differ quite widely. From the standpoint of the table we classify plant products as fruits or vegetables, and courts have held that those eaten during the principal part of the meal, whether cooked or raw, were vegetables, whereas those served as dessert were fruits. Thus string beans are legally vegetables but botanically fruits.

Another distinction wherein the popular and technical notions may or may not agree is that between fruits and seeds. String beans are correctly fruits, the pods; but the beans or peas within this type of fruit are seeds. Tomatoes, for centuries shunned because thought to be deadly, may be vegetables legally, but to the botanist they are not only fruit, but are standard as an example of a particular kind of fruit—the berry. By contrast, strawberries (whether or not pronounced “strom-berries”) are not berries, and Brazilnuts are not nuts! Lest the reader decide by this time that he is being kidded, or has blundered on the script for a quiz show, we had best drop the guess-me-I’m-a-puzzle style and get on with the business of explanations.

An understanding of the definitions, parts, and classifications of fruits and seeds is based on a knowledge of the flowers from which they come, and they in turn consist of various modified leaves.

The enlarged axial termination of a stalk (*peduncle*) that

bears the flower is the *receptacle*. Springing from the base of this is an outer row of scarcely modified leaves, the *sepals*, collectively forming the *calyx*, while next above come the *petals*, the sum of which make the *corolla*; calyx and corolla considered together comprise the *perianth*. The parts listed so far are accessory; the essential parts are the *stamens*, that produce pollen, and *pistils*. Each pistil consists of a *stigma*, or glandular surface on which pollen grains germinate; *style*, or connecting stalk; and *ovary*, containing one or more *ovules*, the future seeds. A detailed account of the flower was given in this Department for June-July, 1940, while adaptations of fruits and seeds for dispersal by winds or animals formed the subject in October, 1937.

The pistil has undergone a greater degree of alteration than any other part of the plant. Regarded as a modified leaf, a simple pistil is termed a *carpel*. In development, the primordium of such a leaf is a flat mass of cells that becomes hollowed and folded, like rolling up a leaf until the edges meet. This line of union is a *suture* and becomes a *placenta* when it develops ovules. These are attached to the outer wall of the ovary (parietal placentation) or to a central axis in certain compound (polycarpellate) ovaries (axillary placentation).

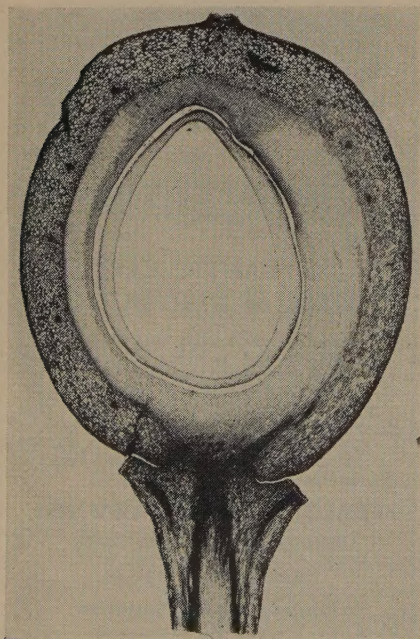
Because the ovary is, in animals, the organ that produces ova, or eggs, there is a growing tendency in botany to substitute the word *ovulary*. Technically, the ovulary contains ovules and each ovule encloses a very much reduced plant of a different generation, which in turn produces an egg.

Armed with this technical vocabulary, we are now ready for definitions. A *fruit* is the seed-bearing organ of a plant that develops from one or more carpels, in many instances incorporating non-ovulary floral structures. A *seed* is the mature ovule, including its integument(s).

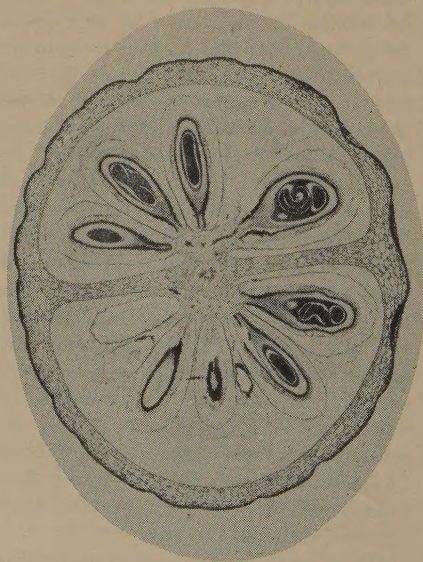
By extension to structures that are superficially or actually similar to the fruits of flowering plants, certain reproductive bodies of lower groups are called “fruits,” as the cystocarp of certain algae, capsules of mosses, pine cones.

Schemes of classification of fruits are many, according to the relative emphasis the particular author wishes to give the several criteria. Mostly, the major division is into (1) simple, (2) complex, a *simple* or *true* fruit being one that develops solely from the ovulary (cherry, pea), a *complex* fruit taking in any of several accessory structures (apple, banana). Unfortunately, this grouping cuts across many of the others. For example; if we adopt the berry as a kind of fruit, then there are simple berries (tomato) and complex ones (goose-

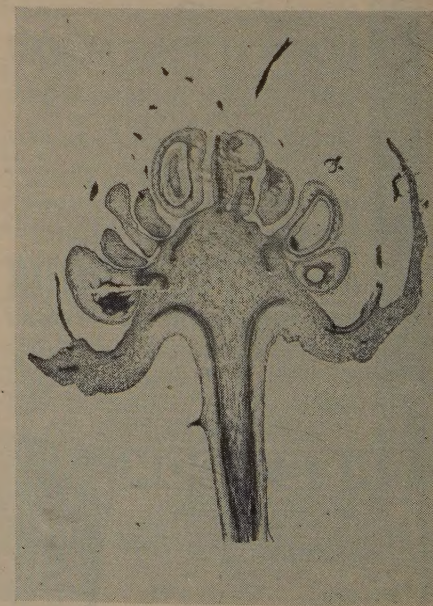
Longitudinal section through a drupe, cherry, 10X.



Section of a tomato, a berry, 10X.



Vertical section of raspberry, an aggregate fruit, 10X.



berry). Also unfortunately, some authors use simple to mean single or unpistillary or *monocarpellate*, referring to the entire fruit resulting from an ovulary consisting of a single carpel, as in buttecup and olive. A simple fruit, as first defined, may be either *mono-* or *polycarpellate*, an example of the latter being the coconut, with three carpels. All of which sums up to the statement that there is no universally accepted classification of fruits.

Another basic difference divides fruits into (1) *dry* (corn, chestnut) and (2) *fleshy* (orange, watermelon). Certain fleshy fruits, when sectioned, as in the accompanying illustration of a cherry, show three distinct regions of the *pericarp* that surrounds the seed and which results from modifications of the ovulary wall. The outermost portion of this wall becomes the peel, skin, or rind (*epicarp* or *exocarp*), the bulk of the wall grows into a *mesocarp*, the edible part of stone fruits, and the innermost layer of the ovulary wall becomes the *endocarp* or pit, hard and stony, and surrounding the seed, which does not appear in our illustration to be anything but a blank space. Actually the cells are there but do not reproduce well in photoengraving. Note that the pit is not itself the seed, but encloses the seed. This construction characterizes the *drupe*, and best known among drupes are cherries, peaches, apricots, plums, olives, avocados, and mangoes, with fleshy and edible pericarps, and coconut, almond, walnut, hickorynut, and pecan, in which the pericarp becomes a fibrous husk and the seed is the edible portion.

A second illustration is a section of a tomato, a *berry*, as also are blueberry, cranberry, gooseberry, grape, persimmon, currant, coffee, date, banana, papaya, and guava. Classed as berries, or given a separate pigeonhole as the *citrocarp* or *hesperidium*, are orange, lemon, lime, and grapefruit, with thick, oily rinds, the interiors divided into wedge-shaped *locules*, each a carpel. A berry is a fleshy fruit with a thin epicarp and a juicy pericarp developed from a polycarpellate flower. Usually there are many seeds, as in tomato, although coffee has but two and the date only one.

The *pepo* is a modified berry in which the receptacle grows into a very hard, tough, outer wall or rind—watermelon, cantaloupe, cucumber, squash, pumpkin. In the *pome*, as exemplified by apples, pears, and quinces, the receptacle forms the fleshy, edible part, while the carpels and their contained seeds make up the core. These are complex fruits.

Dry fruits are either one-seeded and indehiscent (wheat, acorn), or many-seeded and dehiscent (mustard, milkweed). *Dehiscent* fruits split open when ripe to liberate the seeds, *indehiscent* fruits do not, and are in general mistaken for single seeds by most persons. Among

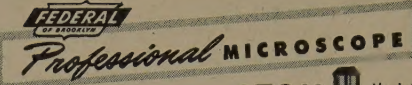
such are the *achene* (sunflower, complex; buttercup, simple), where the dry, single seed is attached to the ovulary wall at only one place.

The *samara* is a winged relative of the achene, the margin or tip of the ovulary growing out into a thin, papery wing, as in maple, ash, and elm. The *nut*, when the term is correctly used in the botanical sense, is also a modified achene. Typically, the ovary is compound, with a number of locules, but only one ovule develops into a seed, at the expense of the others. True nuts include the hazelnut or filbert, acorns, and chestnuts, in the shelled condition. The fruit proper, or ovulary wall, is the shell, the edible part the seed. Cups and husks are accessory structures, representing overgrown *bracts*, which are small, modified leaves springing from the receptacle at the base of the flower. As we have seen, the shelled walnut, hickorynut, and pecan, are not the whole fruit, but only the seeds of drupes, while Brazilnuts and horsechestnuts are seeds of large fruits classed as capsules.

The *grain* or *caryopsis*, occurring in grasses and cereals, as corn, wheat, oats, rye, barley, rice, and many others, is like an achene that has become attached all around and in which the ovulary has fused with the seed to such an extent that they are no longer distinguishable as separate structures. Quite naturally, such grains are popularly regarded as seeds instead of as simple fruits. The *mericarp* is a dry, two-loculed fruit dividing into two indehiscent carpels, each one-seeded. These fruits have longitudinal oil canals and occur in parsley, carrot, parsnip, caraway, and anise.

Among dry, dehiscent fruits, prominent examples are the *capsules*, polycarpellate, with each carpel opening longitudinally (Jimson weed, sweet potato), or by pores at the top (poppy, water lily); *siliques*, with two carpels, the seeds borne on a central partition, opening by two sutures, the carpels pulling away from the elongated middle septum at maturity (cabbage, mustard); *silicle*, the same except rounded instead of elongate (shepherd's purse); *legumes*, pods that split along two, opposite, longitudinal sutures (pea, alfalfa); *loments*, legumes that break up into segments of one seed each (tick trefoil); and *follicles*, dry fruits each of a single carpel, dehiscing along a single ventral suture, to which the several seeds are attached. A flower may give rise to two follicles (milkweed) or more (peony).

Turning to the more obviously complex fruit types, *aggregate* fruits are collections of simple fruitlets. The single flower involved in the formation of these so-called "berries" has numerous separate pistils, which adhere during growth. In the blackberry, loganberry, and dewberry, each ovulary, with its single seed, becomes a true fruit of the drupe type.



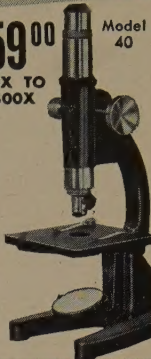
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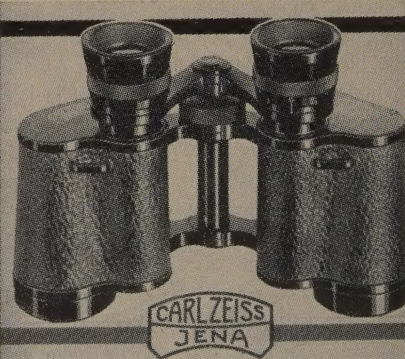
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Because of their small size and formation as a cluster, each is called a *drupelet*. The receptacle becomes fleshy and juicy and breaks away from the peduncle when these fruits are picked. The edible part of the "berry" is then comparable to a cluster of peaches or cherries, with an edible central axis; the "seeds," which are pits or stones containing the true seeds, are unavoidably included in eating these fruits.

The raspberry (illustrated) is similar, but does not include any of the receptacle; the fruit pulls away from the receptacle when picked, leaving its stem end as a hollow cup. The strawberry, often cited as the type of another classification, the *accessory* fruit, is a different sort of aggregation, the fleshy, edible portion being wholly an enlarged receptacle, hence not a true fruit at all. Scattered about in this are many achenes, the so-called "seeds."

The mulberry is still different and, with the pineapple, gives us the most familiar example of *multiple* fruits, which develop from flower clusters. In the mulberry there are separate staminate and pistillate catkins; the pistils of the latter are closely crowded and each ovulary encloses a single drupelet; but the chief edible flesh comes from four sepals in each flower that close over each drupelet and then become thick and fleshy. The fig produces a *syconium*, a hollow, greatly enlarged receptacle, lined on the *inside* with numerous very small, separate flowers. Each of these that is a pistillate flower develops a *nutlet*, the structure that most persons think of as "seeds" in the interior of the fig.

There are both wholemounts of the smaller dry fruits and sections of all types to be made by the microscopist who would like to make up a representative set of slides to bring out these features. Unless he is equipped to use laborious special methods on nut shells and stone fruits, it will be quite essential, with such species, to choose very young specimens for sectioning.

NEW STUDENT MICROSCOPE

The big news in the microscope world this fall is the appearance of an entirely new Bausch & Lomb instrument, the model FL. As their advertising slogan has it, the "F" is for "fine quality" and the "L" for "low cost," and the various features are explained, in the four-page leaflet recently issued, by a smiling and indubitably canny little Scotsman.

Just too late, unfortunately, for inclusion in our comparative analysis of so-called "amateur" microscopes in the August-September issue, the FL has been a carefully guarded trade secret, and now is unveiled as a challenge to rising costs, for the most astounding of the many excellent points about this instrument is its price—\$97.50.

The FL microscope is full-sized in every respect and has all the parts and equipment one has come to expect only on instruments, from the major companies, of twice the cost. A pair of coarse adjustment knobs are located high on the arms, while the smaller pair that operate the fine adjustment are below the level of the stage, at convenient arm-rest height. The construction is entirely new, extra rugged, with fewer castings and parts, to make a simplified design that will stand up under years of hard usage. The engineering aim was to obtain mass production along with precision mechanics.

The optical parts consist of a 10X Huygenian ocular and achromatic objectives of 10X and 50X, to give final magnifications of 100X and 500X, parfocally mounted in a new type revolving nosepiece. There is an adjustable, concave-surfaced mirror, inclination joint, disc diaphragm, and two stage clips. The finish is gray enamel, the stage being usual reagent-proof black. A wooden carrying case is \$14.00 extra.

Made with the high school trade particularly in mind, this microscope will find heavy demand, we predict, from teachers of college freshman courses in biology, botany, and zoology, so as to release the more elaborate and expensive instruments for use in advanced courses. Likewise this new microscope should go over well with amateurs who have decided that

microscopy is their dish, and who have graduated from the miniature-instrument class.

FAMILY ALBUM

2. The Field Glass



Here is a cousin of the microscope, on the distaff side, that appears in numerous guises and under several names. Originally it was the Galilean telescope or, when suitably mounted, the Galilean microscope. The smaller sizes are opera glasses or sports glasses. Binoculars, or binocular telescope, are entirely appropriate designations, but they are, by a

sort of gentleman's agreement, now restricted to *prism binoculars*, a quite different breed of optical instrument, as one quickly finds out if the two are priced, the prism binoculars averaging five to ten times as much as the simpler glass. Field glass or glasses is definitely the preferred term when such an instrument is used outdoors, as for bird study or at the race-track or football game; opera glass or glasses when employed indoors.

The optical system is completely double, one side being a duplicate of the others. Each half consists of a body tube, in which an achromatic object glass is mounted, and an eyepiece tube, smaller in diameter, containing an eyelens that may or may not be achromatic. The two tubes are connected by one or more bridge pieces, and the two eyepiece tubes are moved in or out of the bridge pieces by turning a focusing screw. Most field glasses are not equipped with a central hinge, but this feature occurs on a few of the better makes. When present, it allows moving the two parallel telescopes closer together or farther apart, thus permitting an adjustment for variation in the interpupillary distance of different persons.

In the field glass, each object glass is convex and, when the object to be viewed is outside the principal focus, is capable of forming a real image. However, before this image is focused, the eyepiece lens, which is concave, interrupts the path of the light rays, diverges them, acting as an amplifier, and enlarges the image, which is then erect and virtual. This means that the human eye is essential to the reproduction of any image; the retina receives the real image, and the observer thinks he sees the virtual image projected out in front of him, closer and larger than the object itself.

If the eyepiece of one half of this pair of glasses is unscrewed and removed some distance, but still help along the optical axis, a magnified image of a specimen close to the object glass can be obtained. In other words, this glass can be made to serve as a microscope.

Among advantages of the field glass may be mentioned the binocular feature—it is distinctly helpful to be able to use both eyes—the erect image, which does not require additional erecting lenses, at additional expense, as does the terrestrial telescope; the small, compact size and light weight; and the low cost. Usage should be limited to objects relatively nearby, for which magnifications of 2, 4, or 6X are satisfactory. Disadvantages include: the object glasses cannot well be made of a diameter greater than two inches, for then their interocular distance would be too large to fit the human face; this restricts the size of the field, which is small, as well as the degree of magnification; since no real image is formed anywhere inside the instrument, it is impossible to equip this form of glass with crosshairs, pointers, scales or graticules, since these must lie in the plane of the real image if they are to appear as if projected upon the object.